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DISEASES CAUSED BY BACTERIA AND FUNGI.

STARK, PAULINE, & SHERMAN, J. M. (1935). **Concerning the Habitat of** *Streptococcus lactis*.—*J. Bact.* **30.** 639-646. [17 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **11.** 655-656. Signed G. S. WILSON].

The authors isolated 200 strains of *Str. lactis* from various sources, such as fresh corn, navy beans, cabbage, wheat, garden peas, and head lettuce. Cultures from mature corn, aged heads of cabbage, lima beans, alfalfa, soil, and intestines of earth worms, proved negative; but the number of samples examined was fairly small. The organism was not found in the mouths and throats of cows, nor in bovine or human faeces, though *Str. faecalis* was isolated from all these situations. It would appear that certain plants constitute the natural habitat of *Str. lactis*, and that this organism finds its way into milk from these sources.

ROUNTREE, Phyllis M. (1936). **Preliminary Note on the Dissociation of Staphylococci into Alpha and Beta Toxigenic Variants.**—*Aust. J. exp. Biol. med. Sci.* **14.** 93-95. 1 fig. [4 refs.]

Certain strains of *Staphylococcus aureus* were found which dissociated into α toxin-producing types and β toxin-producing types. When single colonies of the α toxin type were plated out, they gave from 1 to 2% of the β toxin type. This variation is thought to be of the phasic type. The α phase could not be stabilized. The β variant, when first produced, tended to revert, producing about 90% of α types, but certain of the β variants became stabilized, after which it was no longer possible to obtain reversion.—W. I. B. BEVERIDGE.

I. DE MOULIN, F. W. K. (1936). Onderzoek naar de oorzaak van den apoplectischen dood bij miltvuur. [**The Causes of Sudden Death in Anthrax**].—*Ned.-ind. Bl. Diergeneesk.* **48.** 126-191. 3 figs., 4 tables. [Numerous refs.]

II. LÜTJE. (1936). Beobachtungen über Milzbrandvorkommnisse im Stader Niederelbegebiet. [**Anthrax in the Lower Elbe District, Germany**].—*Dtsch. tierärztl. Wschr.* **44.** 719-726. 13 figs., 1 table. [1 ref.]

III. REYNA, J. L. (1936). **First Anthrax Outbreak in Leyte.**—*Philipp. J. anim. Indust.* **3.** 397-410. 4 tables.

I. A detailed study of the cause of death in anthrax. Examinations were made of a large number of natural and experimental cases of anthrax, including artificially inoculated birds.

It is considered that death is due to asphyxiation, and that the primary cause of asphyxiation constitutes the main subject for study. Anaemia, haemolysis and myocardial degeneration, considered as possible causes of asphyxiation, failed to offer adequate explanation of the known facts. It was found that, in experimental anthrax, lesions were always demonstrable in the central nervous system and spinal ganglia even before symptoms were seen; also, such lesions were to be found if insusceptible animals such as birds were inoculated with anthrax bacilli. Lesions of nervous tissue were degenerative, including cell atrophy, vacuolization of ganglion cells, karyolysis, etc. Very similar changes were found in the tissues of animals which had died of natural anthrax. It is concluded, therefore, that asphyxia is due to destruction of the tissues which constitute the respiratory centre of the brain.

The thesis is developed to explain certain anomalies in anthrax immunization. An acute attack of anthrax followed by recovery, or alternatively, particularly potent vaccination, is not necessarily followed by a strong immunity, and animals so treated, if subsequently reinoculated with relatively avirulent bacilli, may die or at least show very severe symptoms. It is suggested that the primary infection (or vaccination) produces permanent damage to nervous tissue and that, consequently, mild secondary infections can produce exaggerated effects.

It is thought that lesions in the nervous system are due to some toxin-like substance associated with the bacteria, since lesions of the nervous tissue may be found before septicaemia has supervened and before anthrax bacilli can be demonstrated in the affected tissue.

II. Prior to 1931, a considerable number of cases of anthrax in domestic animals were diagnosed annually, but in recent years the incidence has fallen to almost negligible proportions. Cattle and pigs have been the animals commonly affected. Drawings are included (with descriptive text) of the pathological lesions in various tissues which at *post-mortem* examination appeared to show a definite localized infection of anthrax over and above the generalized signs of septicaemia.

III. The report of an outbreak of anthrax in man as a result of the consumption of meat from a carabao [water buffalo] which had died of anthrax. It was concluded that anthrax bacilli are not readily isolated from infected carabaos, and that cases may be missed particularly if the epidemiology is complicated by a concurrent outbreak of haemorrhagic septicaemia.—E. J. PULLINGER.

I. TENHAEFF, C. (1936). Het miltvuur bij het vee in Friesland. [**Anthrax in Friesland**].—*Tijdschr. Diergeneesk.* **63.** 130-140 and 193-209. 6 tables, 3 charts. [9 refs.] [English, French and German summaries].

II. OVERBEEK, A. A. (1936). Miltvuur. [**Epidemiology of Anthrax in Cattle in Holland**].—*Ibid.* 603-605. [English, French and German summaries].

III. TEN HOOPEN, W. (1936). Het miltvuur bij het vee in Nederland. [**Anthrax in Cattle in Holland**].—*Ibid.* 606-612. 1 graph. [1 ref.] [English, French and German summaries].

IV. TENHAEFF, C. (1936). Het miltvuur in Nederland. [**Anthrax in Holland**]. —*Ibid.* 1159-1174. 2 tables. [6 refs.] [English, French and German summaries].

I. This is a discussion on the incidence of anthrax in parts of Holland in which the level of surface water is high, such as on reclaimed land protected by high earthworks and dykes.

The author is of the opinion that anthrax in cattle occurs no more frequently in Friesland than in the other provinces of Holland and that it is only of sporadic occurrence. It appears more particularly in the winter months, when the cattle

are stabled. Neither floods, nor the feeding of imported foreign corn, nor the importation of foreign hides, are, in the first instance, responsible for outbreaks of anthrax.

The reclaimed land is constantly rather waterlogged and so the deep burial of carcasses is not practicable. When anthrax carcasses are buried superficially the upper layers of soil become infected with anthrax spores, which during the work involved in routine drainage and cultivation tend to be scattered on the ground surface.

II. Overbeek thinks that the infection is due to the dried hides of animals, which have died of anthrax, imported from East Europe, Asia and America. The harbour workmen who unload the hides very frequently contract anthrax. He emphasizes the international aspect of the anthrax problem.

III. Ten Hoopen discusses the causal relation between imported fodder and the control of anthrax. Only 1% of the cases can be ascribed with certainty to a soil infection. Anthrax is seen in pigs when they are fed with infected foreign barley. Once, when anthrax appeared on several farms in the same part of Holland, it was shown that the foreign food used issued from the same dealer.

IV. Tenhaeff brings forward several arguments in support of his conclusion that anthrax in Friesland is chiefly caused by soil infection. From 11% to 12% of the cases in Friesland occur on farms where anthrax is enzootic.

—M. J. J. Houthuis (Rotterdam).

Gochenour, W. S., Schoening, H. W., Stein, C. D., & Mohler, W. M. (1935). **Efficacy of Anthrax Biologics in producing Immunity in previously Unexposed Animals.**—*Tech. Bull. U.S. Dep. Agric.* No. 468. pp. 15. 4 figs., 9 tables. [1 ref.]

The authors refer to certain limitations in immunization with the Pasteur first and second vaccines and to work done to improve on the system.

Reference is made to potency tests, beginning in 1925 and conducted by the senior author. Later, comparative experiments were carried out by the writers in 1933 and 1934. In the latter tests, the products used were anti-anthrax serum, anti-anthrax serum and anthrax-spore vaccine used in combination, anthrax-spore vaccine (single injection), anthrax-spore vaccine (intraderm.), anthrax-spore vaccine in saponin solution, and anthrax bacterin (washed culture).

The experiments are described, tables and figures are furnished, and the results of the tests are discussed.—J. M. L. Penhale.

I. Anon. (1936). **Bovine Tuberculosis.**—*Quart. Bull. Hlth Org. L.o.N.* 5. 165-166.

II. du Toit, P. J. (1936). **Bovine Tuberculosis.**—*Ibid.* 166-168.

I. No definite information is available to show that, in South Africa, the bovine type of tuberculosis is responsible for the human cases of disease, though the infection in cattle is as virulent as elsewhere.

II. In the Union of South Africa no serious attempt has been made to assess the role played by the bovine type of tubercle bacillus as the cause of tuberculosis in man. No extensive figures are available of the incidence of tuberculosis in South African cattle, but it probably varies from about 40% in herds near big towns to 10% amongst those around small towns and 2% in rural areas. Only 0·031% of bulls and oxen and 0·152% of cows examined at Johannesburg abattoir between 1917 and 1929 showed lesions of tuberculosis. The importance of bovine tuberculosis in other areas of equatorial and southern Africa is discussed briefly.

A national scheme of eradication is necessary and complete eradication is the

goal at which to aim. Partial eradication as practised in the United Kingdom or BCG vaccination would only serve as temporary palliatives.—E. J. PULLINGER.

OXSPRING, G. E. (1936). **Ringbone Probably Associated with Tuberculosis.**—*Vet. Rec.* **48.** 707-709. 4 figs.

On X-ray examination of an officer's charger, a cavity in the first phalanx of a fore limb was seen. The horse was killed and the bone boiled and examined by sectioning. The cavity communicated with the proximal articular surface by a minute channel and contained caseous material which was rich in acid-fast bacilli. The diagnosis of tuberculosis could not be verified, as it was not possible to carry out a general autopsy or any bacteriological tests.—J. E.

BOQUET, A., & LAPORTE, R. (1936). Tuberculose osseuse et ostéo-articulaire expérimentale chez le lapin. [**Experimental Osseous and Osteo-Articular Tuberculosis in the Rabbit**].—*C. R. Acad. Sci., Paris.* **202.** 252-254.

The authors report the production of osseous and osteo-articular tuberculosis in rabbits, the lesions being similar to those found in analogous conditions in man. Three months after intradermal inoculation with 0·00001 mg. of a very virulent strain of the bovine bacillus, signs of localization of the organisms in the leg bones and vertebral column were evident, and after a further one to three months the rabbits died in a state of advanced cachexia. The pathogenesis of the lesions and the autopsy findings are described.—N. J. SCORGIE.

I. NÈGRE, L., & BRETEY, J. (1936). Sur la prémunition antituberculeuse du cobaye, du lapin et du singe par les variétés lisses de bacilles tuberculeux. [**Antituberculous Premunition of the Guinea Pig, Rabbit and Monkey with Smooth Strains of Tubercle Bacilli**].—*Bull. Acad. Méd. Paris.* **115.** 341-344. [10 refs.]

II. NÈGRE, L., VALTIS, J., & BRETEY, J. (1936). Pouvoir prémunisant antituberculeux des bacilles tuberculeux à colonies lisses. [**Premunizing Value of Smooth Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **56.** 609-619. [11 refs.]

III. ARMAND-DELILLE, P. F. (1936). Sur la résistance conférée au singe par l'inoculation d'une souche S de bacille tuberculeux humaine isolé par hémoculture. [**Resistance Conferred on the Monkey by the Inoculation of an " S " Strain of Tubercle Bacillus of the Human Type Isolated by Blood Culture**].—*C. R. Acad. Sci., Paris.* **202.** 1463-1465.

I. N. and B. tested the premunizing power, for g. pigs, rabbits and monkeys, of an " S " strain of tubercle bacilli obtained from g. pigs injected with human tubercle bacilli and then treated with acetone extracts of tubercle bacilli, and describe the lesions produced in g. pigs and rabbits. In all cases less reaction to a test dose occurred in the treated than in the control animals. The authors are not yet sure if these artificially produced " S " strains will remain fixed or revert to pathogenicity.

II. The authors first describe the common properties of several " S " strains of tubercle bacilli isolated by themselves and others from tuberculous g. pigs after various treatments, and also the peculiar properties of the human " Bec " strain, which yields " R " and " S " variants. Large doses (10 mg.) of these " S " strains produce in g. pigs an infection of the lymph nodes and organs lasting for more than a year and, when cultures are then made from such organs on Löwenstein's medium, similar colonies develop with identical properties.

Detailed experiments with g. pigs and rabbits show that the " S " variant has more premunizing power than the " R " variant of the " Bec " strain and the

authors suggest that this may be due to the greater lipoidal content in the former. Both the BCG bacillus and Arloing's bacillus have a high lipoidal content.

If " S " strains are heated for one hour at 70°C. they lose most of their immunizing power in the same degree as " R " strains.

III. A.-D. refers to the fact that his previous attenuation of " S " strains of tubercle bacilli on various media caused the loss of all pathogenicity for the g. pig and monkey. He now reports two attempts to premunize monkeys with such an " S " strain. He describes the lesions produced in the two treated monkeys and their controls after test doses of virulent tubercle bacilli given by injection (subcut. and intrapulmonary). In each case they were more localized and benign than in the controls. The monkey tested by the intrapulmonary route died before its control, but the lesions were confined to the superior lobe of the inoculated lung and its associated lymph node. Both controls died of generalized tuberculosis. —C. V. WATKINS.

ISHIBASHI, T. (1936). Die vom Geflügeltuberkulose-Bazillus verursachte allgemeine Drüsentuberkulose mit universellem parapsoriasiformem Tuberkulid. [**Human Infection with the Avian Tubercle Bacillus**].—*Derm. Wschr.* **101.** 1212-1217. 3 figs. [7 refs.]

Acid-fast bacteria, which behaved in culture and in animal inoculation tests in the same way as the avian tubercle bacillus, were isolated from an enlarged axillary lymph node of a man affected with a generalized papular eruption of three years' duration. I. refers to 50 cases of tuberculosis (avian type) in man that have been recorded.—J. E.

I. UKIL, A. C., & GUTHA THAKURTA, S. R. (1936). **A Comparative Study of Culture and Animal Inoculation as Methods for Isolating Tubercle Bacilli from Pathological Materials.**—*Indian J. med. Res.* **24.** 109-117. 5 tables. [19 refs.]

II. GUTHE, T. (1936). **The Methylene Blue Reduction of the R and S Varieties of Mycobacterium tuberculosis.**—*Acta path. microbiol. scand.* Suppl. 26. pp. 131-142. 2 figs., 2 tables. [7 refs.] [In English].

III. LAPORTE, R. (1936). Étude microbiologique du bacille tuberculeux du type bovin. [**Microbiology of the Bovine Type of Tubercle Bacillus**].—*Ann. Inst. Pasteur.* **57.** 400-442. 8 figs. on 2 plates, 4 tables. [Numerous refs.] [Erratum p. 582].

I. The authors conclude that the culture method, using Petragnani's medium, is superior to other diagnostic methods. In addition to its cheapness and ease of technique, it saved considerable time and made it possible to proceed at once with typing tests. They admit, however, that g. pig inoculation cannot be dispensed with altogether, as a combination of both methods gave a higher percentage of positive findings than the culture method alone.

II. Attempts were made to measure the differences in methylene blue reducing power of the " R " and " S " varieties of a bovine, a human and an avian strain of tubercle bacilli. Both the " R " and the " S " varieties of avian and mammalian tubercle bacilli possessed the power of reducing methylene blue. The " S " variety of the mammalian strains reduced the dye much more rapidly than the " S " variety of the avian strain. In the case of the " R " varieties the reduction was more pronounced when caused by the avian strain than when caused by the mammalian strains.

III. L. studied the cultural characteristics of 49 strains of tubercle bacilli– 5 human and 44 bovine. When first isolated the majority of his bovine strains

were of the " S " dysgonic type. After repeated sub-culture, all the bovine strains gave, more or less quickly, " R " eugonic cultures similar to human strains. This instability of type varied greatly with individual strains. The dissociation was favoured by potato, glycerin broth or Sauton's synthetic medium. Serum and egg media seemed to favour the retention of " S " dysgonic characteristics.

Recently dissociated " R " eugonic strains were unstable, passage on egg medium tending to give some colonies of the " S " dysgonic type. On the other hand very old " R " strains showed remarkable stability. The dissociation of bovine bacilli would, therefore, seem to be a reversible phenomenon which does not stabilize itself for a long time. No difference was observed in the pathogenicity for g. pigs of these " S " and " R " varieties of recently dissociated bovine strains. L. concludes that the dissociation of bovine strains is merely a variation of the morphological aspect of the colonies appearing in strict relationship to changed conditions of culture, and is really an adaptation to environment.—A. ROBERTSON.

I. BEACH, J. R., & SCHALM, O. W. (1936). **Studies of the Clinical Manifestations and Transmissibility of Infectious Coryza of Chickens.**—*Poult. Sci.* **15.** 466-472. 3 figs., 1 table. [8 refs.]

II. SCHALM, O. W., & BEACH, J. R. (1936). **Studies of Infectious Coryza of Chickens with Special Reference to Its Etiology.**—*Ibid.* 473-482. 6 figs., 4 tables. [9 refs.]

I. On the basis of the isolation of the organism named *Haemophilus gallinarum* and of the transmission of the disease by inoculation, B. and S. have diagnosed infectious coryza in a number of flocks in California. In some cases it appeared as a simple coryza and gave rise to no general disturbance of health, while in others it was associated with complications and showed a mortality of 50%.

Attempts to transmit the condition by the inoculation of exudates, and by direct and indirect contact, were successful, but transmission by exposure to contaminated environment was successful only when the exposure was made immediately after the removal of infected birds. Where an interval of 24 hours was allowed to elapse no transmission took place. The condition was also transmitted from birds after recovery, but the incubation period was relatively very long.

II. The organism *H. gallinarum* isolated from cases of infectious coryza was found to be a short pleomorphic rod, showing marked bipolar staining. It had to be subcultured at short intervals to be maintained, and required an atmosphere of 10% CO_2 for growth.

Inoculation into birds resulted in the production of a coryza which was of much shorter duration than that following natural infection or the inoculation of exudate, and recovered birds were not resistant to infection by exudate.

Rapid serial passage through birds resulted in a rise in virulence, and it is considered that the organism loses virulence on artificial media, and that this accounts for the relative mildness of the disease produced by inoculation of cultures.—W. J. IRONSIDE.

GRAHAM, R. (1936). **Cornstalk Disease Investigations. Toxic Encephalitis or Non-Virus Encephalomyelitis of Horses.**—*Vet. Med.* **31.** 46-50. 3 figs., 2 tables, 2 graphs, 4 photographs. [3 refs.]

G. made investigations into "cornstalk disease," which occurred in epizootic proportions in Illinois in the autumn of 1934 and entailed a loss of approximately 5,000 horses. He discusses the relation of damaged "corn" and/or "cornstalks"

(maize stalks) to the disease and states that the majority of horses which succumbed were receiving damaged "corn" or "cornstalks".

The condition is afebrile and is marked by disturbance of the brain and cord. Lethargic, nervous and paralytic syndromes are recognized. Clinically, the condition is indistinguishable from the eastern or western types of encephalomyelitis of horses after the febrile stages of these infections have passed. In 65% of 55 horses examined for gross changes, unilateral or bilateral areas of softening in the cerebrum were found.

Bacteriological examinations of the brains of various affected horses revealed the presence of diplococci, streptococci, staphylococci, *Bact. coli*, pasteurella-like micro-organisms and several types of moulds.

Inoculation experiments failed to reveal the presence of a filtrable virus. Microscopic examinations of cerebral tissue adjoining the areas of liquefaction revealed perivascular oedema, haemorrhage and degenerative changes of the nerve cells. There was no evidence of perivascular round-cell infiltration such as occurs in the virus type of equine encephalomyelitis. The author is inclined to incriminate the pasteurella and dicusses conditions in which infection may occur, and a possible relationship to the damaged "corn."—D. R. WILSON.

WILLE, R. (1936). Hämodynamische Untersuchungen über die Verkalbeseuche. [**The Infection Mechanism in Bovine Contagious Abortion**].—*Tierärztl. Rdsch.* **42.** 703-707. 8 figs.

W. refers to a previous paper [*V. B.* **6.** 535.] in which he postulated that the blood supply to the brain, reproductive system, alimentary canal and udder was under the control of a common vasomotor centre. When this centre is functioning normally, an increased blood supply is assured in those organs where it is most necessary, *e.g.*, the uterus of the pregnant cow or the udder of the lactating cow. If the centre is functioning weakly, these organs either do not receive an increased blood supply, or, if they do, only at the expense of other organs, *e.g.*, sterility may arise from a disproportionate blood supply to the alimentary canal and the udder during excessive feeding or lactation. In the same way W. believes that two factors are necessary for the occurrence of abortion, *viz*, vasomotor dysfunction causing hypoaemia of the uterus and infection with *Br. abortus*, the latter *per se* not being able to cause abortion. [No experimental data are brought forward to support the author's hypothesis].—N. J. SCORGIE.

THOMSEN, A. (1936). Bidrag til Belysning af Spørgsmaalet om Parrings-smittens Forekomst ved Kvaegets smitsomme Kastning. (2 Meddelelse). [**Transmission of Bovine Contagious Abortion by Coitus**].—*Maanedsskr. Dyrlaeg.* **48.** 225-233. 4 tables. [2 refs.]

In 1928 it was concluded that the bull could be considered to have no importance in the spread of brucellosis. Investigations now reported upon make it evident that infected bulls often transmit the disease to females by coitus. 50% of ten cows infected in this way aborted. Abortion occurred rather late, on an average 225 days after conception. Generally speaking, the blood reactions developed slowly, but positive reactions were obtained at the time of abortion.

—H. C. BENDIXEN (COPENHAGEN).

NIKOLAEV, V. A. (1936). Opit virascivanija zdorovovo skota iz čisla teljat brucelleznich chozjajstv. [**Attempt to Rear Healthy Cattle from Calves on Brucella-Infected Farms**].—*Sovyet. Vet.* No. 6. pp. 55-56.

A special farm was taken over in 1931 for the raising of cattle free from brucella

infection. N. reports progress from 1933-1935, during which period a total of 107 calves from five infected herds was added. Non-reacting (blood aggl. test) calves were first placed in quarantine at an intermediate quarantine farm for two to three months, retested and then sent to the special farm, but were not mixed with the original herd until they had been kept in an isolated pasture during the summer and had passed the test again in the autumn, when between 12 and 20 months old.

It is claimed that it has been possible to build up a brucella-free herd by the use of the non-reactor calves, each step in the method detailed being, however, necessary.

ZELLER, H. (1936). Das Ergebnis der staatlichen Untersuchung über die Ausbreitung der Bruzellose des Rindes. [**Results of State Control of Bovine Brucellosis**].—*Dtsch. tierärztl. Wschr.* **44.** 751-753. [1 ref.]

ERHARDT. (1936). Die staatliche Bekämpfung der Bruzellose des Rindes. [**Control of Bovine Brucellosis**].—*Ibid.* 753-757. [4 refs.] [Also appeared in *Dtsch. Tierärztebl.* **3.** 493-498].

GÖTZE, R., & MULLER, J. (1936). Ueber wissenschaftliche Grundlagen und Erfahrungen bei der Abortusbekämpfung. [**Control of Bovine Brucellosis**]. —*Ibid.* 767-771. 1 table. [6 refs.]

KARSTEN. (1936). Erfahrungen bei der Bekämpfung der Rinderbruzellose. [**Control of Bovine Brucellosis**].—*Ibid.* 771-775. 1 table.

PRÖSCHOLDT, O. (1936). Erfahrungen bei der Bekämpfung der Rinderbruzellose. [**Control of Bovine Brucellosis**].—*Ibid.* 775-777.

TRAUTWEIN, K. (1936). Erfahrungen bei der Bekämpfung der Bruzellose. [**Control of Bovine Brucellosis**].—*Ibid.* 783-786. [1 ref.]

WAGENER, K. (1936). Erfahrungen bei der Abortus-Bang-Bekämpfung der Rinder. [**Control of Bovine Brucellosis**].—*Ibid.* 786-790. 1 table, 3 charts.

THOMSEN, A. (1936). Erfahrungen bei der Bekämpfung der Rinderbruzellose in Dänemark. [**Control of Bovine Brucellosis in Denmark**].—*Ibid.* 790-792. 1 table.

MANNINGER, R. (1936). Erfahrungen über die Bekämpfung der Rinderbruzellose in Ungarn. [**Control of Bovine Brucellosis in Hungary**].—*Ibid.* 799-801. 1 table. [1 ref.]

ANON. (1936). Antrag der Fachtierärzte für die Bekämpfung des Aufzuchtkrankheiten auf der 8. Tagung in Berlin am 17.9.1936. [**Motion on the Control of Brucellosis (at Meeting of Veterinary Specialists on Diseases of Breeding Animals, Berlin, 1936)**].—*Ibid.* 821.

A long series of articles expressing the opinions of the various authors on certain aspects of the control of contagious abortion, with particular reference to the practicability of voluntary eradication schemes. None of the schemes in progress are of long enough duration, or on a sufficiently large scale, for useful conclusions to be drawn. Such statistical material as is included serves to illustrate small sections of the problem, but is of no value for comparative purposes. Much of the information regarding incidence and the value of control measures such as vaccination and chemotherapeutic procedures has already been abstracted in the *Veterinary Bulletin.*

The general consensus of opinion regarding control measures differs in no essential from that held in Great Britain. All control measures are dependent upon the natural methods of infection which are :– (a) direct from cow to cow by licking, splashing, picking-up of contamination from the ground, etc. ; (b) indirectly by the drinking of contaminated milk by calves which, apart from any danger of becoming infected themselves, broadcast infection by excreting living

organisms in their faeces, and (c) spread during coitus, the bull acting either as a passive vector or occasionally actively through infection of the male genitalia. With regard to the last-mentioned, it is noteworthy that Karsten records that 1·73% of 5,076 stud bulls gave positive agglutinin reactions.

Control measures, therefore, include identification of infected animals by the blood agglutination test and by milk examination. Reactors must be segregated and if possible culled, but in no case should a reacting cow be served by a bull used for healthy cows. In addition to elimination of infected animals excellent conditions of hygiene must be maintained and the use of separate and easily cleaned calving boxes, calf pens, etc., is particularly essential.

It is emphasized that in the course of a voluntary campaign an occasional herd will again show infection. Failures of this type are attributable to a number of causes, including faulty diagnosis, misinterpretation of doubtful reactions, inadequacy of quarantine measures, etc.

Most writers are agreed that the disadvantages outweigh the advantages as regards the use of live vaccine, and that killed vaccines are of little value. No convincing evidence is advanced in support of chemotherapeutic measures.
—E. J. Pullinger.

Anon. (1936). Foreløbig meddelelse fra Veterinaer-direktøren om resultatet av bekjempelsen av smittsom kastning pr. 1/7 1936. [**Preliminary Report on the Control of Bovine Contagious Abortion in Norway**].—*Norsk VetTidsskr.* **48.** 342-345. 2 figs., 1 table.

The Veterinary Director gives the results of the campaign against B.C.A. in Norway (according to his new scheme) which has now been in force for a year and a half. During this period, 2,567 infected herds were detected and notified. 2,023 herds (79%) became clean [at first retest after removal of reactors] and 1,561 herds (61%) were considered to have become completely free from the infection [after second retest after removal of reactors]. In 374 herds (15%) the work has advanced so far that it is anticipated that the eradication will be complete within a relatively short time. In most of the remaining 170 herds (6%) eradication work has only recently been commenced.—Gustav Naerland (Oslo).

Taylor, R. M., & Jorgensen, J. J. (1936). Étude des divers modes d'infection expérimentale des ovins par *Br. melitensis*. [**Experimental Infection of Sheep with** *Br. melitensis*].—*Rec. Méd. vét.* **112.** 140-152. 7 tables. [Numerous refs.]

It has already been shown that in various species, *e.g.*, cattle and g. pigs, and also in man, infection with brucella may be more easily produced, *i.e.* with smaller doses, *via* the skin (scarified or intact), or *via* the conjunctiva, than by the oral route. T. and J. have, therefore, in view of the close association that exists between undulant fever of human beings and contact with infected sheep in the south of France, attempted to infect sheep by various routes, comparing the results obtained by blood culture and by agglutination, complement-fixation and intradermal tests respectively. The strain used was one of *Br. melitensis* recently isolated from a goat. Seven sheep were used. Infection was produced in one sheep by the application of one drop of culture to the scarified skin. In two other sheep, the application to the skin of a paste of faeces containing 0·2 c.c. of culture per g. of faeces failed, whilst application of a paste containing 2 c.c. of culture per g. was followed by infection; in one case the skin was scarified, in the other not. One sheep received 0·2 c.c. and eight weeks later 10 c.c. of a culture by stomach tube. This gave a low agglutination titre but no other evidence of infection, and is

regarded as a negative result. Another received 1 c.c. and 30 c.c. by the same route and remained negative. A sixth sheep became infected after the application of an infected tampon to the nostril. The seventh became infected after receiving 30 c.c. of culture in the drinking water but, in view of the success of application to the nasal membrane and failure to infect by stomach tube, this may not have been infection by ingestion, but *via* the oral or nasal mucous membrane.

It is concluded that in the sheep the skin and mucous membrane are frequent portals of entry, whilst oral infection is rare. As regards drinking water, the dose may be important.—A. W. STABLEFORTH.

THOMSEN, A. (1936). Om Kalvekastningsfeberens Forekomst hos danske Dyrlaeger og Veterinaerstuderende. [*Brucella abortus* **Infection in Danish Veterinarians**].—*Maanedsskr. Dyrlaeg.* **48.** 161-169. 1 table. [6 refs.]

94% of veterinarians who have been practising for more than a year have antibodies against *Br. abortus* in their blood serum and are considered to have become immunized. Undulant fever among veterinarians occurs most frequently in young practitioners and in veterinary students. There were 17 cases between January, 1931, and the autumn of 1935. The cases are frequently severe and of long duration. Precautions against infection must be taken with the students at college, and vaccination is recommended when leaving the college for work as a practitioner.—H. C. BENDIXEN (COPENHAGEN).

DUBOIS, C. (1936). Recherche des agglutinines chez la vache et la brebis indemnés de brucellose, soumises à l'injection de *Brucella abortus*, vivants ou morts, en excipient gras. [**The Production of Brucella Agglutinins in Immune Cows and Sheep by the Injection of Living or Dead** *Br. abortus* **in a Fatty Base**].—*C. R. Soc. Biol. Paris.* **121.** 529-533. [1 ref.]

D. concludes, from a series of experiments on normal sheep and cows, that the injection (subcut.) of a vaccine consisting of living avirulent *Br. abortus* (porcine) in a base composed of liquid paraffin, lanolin and lycopodium powder produces a considerable agglutination titre usually maintained for a long period (three to nine months). In cows the response was correlated with the dose. A similar vaccine made with heat-killed *Br. abortus* had a much inferior antigenic value. The dose for sheep contained 1 mg. of bacterial bodies, and that for cows 4 or 8 mg. —A. W. S.

POPPE, K. (1936). Pathogenese und Bekämpfung der Bruzellose des Menschen. [**Pathogenesis and Control of Human Brucellosis**].—*Dtsch. tierärztl. Wschr.* **44.** 803-805.

THOMSEN, A. (1936). Die Bruzellose des Schweines. (Eine dänische Epizootie). [**Brucella Infection in Swine**].—*Ibid.*, 805-808.

HIERONYMI, E. (1936). Die Bruzellose des Pferdes. [**Equine Brucellosis**].—*Ibid.* 808-810.

LUTJE. (1936). Ueber die Bruzellose des Pferdes. [**Equine Brucellosis**].—*Ibid.* 815-816. [2 refs.]

I. A brief survey of human brucellosis. In Germany the highest incidence of undulant fever is amongst workers on farms and in dairies and milk factories. Veterinary surgeons, slaughterers and laboratory workers are also frequently infected.

II. An abbreviated version of another article [*V. B.* **5.** 606].

III. Brucella infection in horses is usually of a pyogenic type involving bursae; only the bovine type of *Br. abortus* has been isolated from horses. Sero-

logical examination of horses revealed agglutinin titres ranging between 1 : 100 and 1 : 40,000, but the incidence of positive reactors amongst horses is low, *e.g.* 0·5%, out of 600. Nevertheless cases have been recorded of heavily contaminated farms on which practically all the horses were infected.

IV. Whilst *Br. abortus* does act as a pyogenic infection in horses, it is of little importance in this respect. Out of 3,419 horses examined, 17 gave positive serological reactions and of these 14 showed pus formation. On the other hand, 911 animals showing pus formation were not infected with brucella.—E. J. P.

I. Stockmayer, W. (1936). Ueber die Serodiagnose der Bruzellose. [**Serological Diagnosis of Brucellosis**].—*Dtsch. tierärztl. Wschr.* **44.** 817-819.

II. Miessner. (1936). Die Serodiagnose der Bruzellose. [**Serological Diagnosis of Brucellosis**].—*Ibid.* 819-820. [1 ref.]

I. The agglutination test is considered superior to the complement-fixation or flocculation tests (Meinicke and Sachweh) for the early and efficient diagnosis of brucella infection. The attention of German workers is drawn to the need for standardization of the antigen to be used in the test and to the work of Stableforth on this subject [*V. B.* **7.** 184].

II. In addition to blood tests, quarter samples of milk should be examined for antibodies. To simplify the test, a rapid slide technique may be used for all serological work. The need for repeated herd tests is emphasized and M. advocates strongly the standardization of all reagents.—E. J. Pullinger.

I. Larisch, W. (1935). Vergleichende Untersuchungen über die Brauchbarkeit der Milch-Hund Blutschnellagglutinationen mit den Testflüssigkeiten nach Berge-Ekrem und nach David für die Praxis. [**Rapid Milk and Blood Agglutination Tests for *Brucella abortus* Infection**]. *Inaug. Diss., Hanover.* pp. 47. 12 tables. [Numerous refs.]

II. Schultze, E. (1936). Neue Geräte für die Probeagglutination auf Objektträgern. [**Apparatus for Slide Agglutination Tests**].—*Z. InfektKr. Haustiere.* **49.** 141-145. 2 figs.

III. Diernhofer, K. (1936). Sachgemässe Verwertung der Ablesungen bei der Agglutinationsprobe mit Bangantigen. [**The Evaluation of the Agglutination Test with *Brucella abortus* Antigen.**—*Ibid.* 146-162. 4 tables.

IV. Diernhofer, K. (1936). Erfahrungen mit der Bang-Schnellagglutination in der Praxis. [**The Rapid Agglutination Test for *Brucella abortus* Infection**]. —*Münch. tierärztl. Wschr.* **87.** 361-365. 3 figs.

V. Ernesti, S., & Zerbel, E. (1936). Ueber den diagnostischen Wert der Agglutination bei der Bang-Infektion des Rindes. [**Value of the Agglutination Test for Bovine Contagious Abortion**].—*Tierärztl. Mitt.* **17.** 527-533 and 547-551. 1 table. [Numerous refs.]

I. L. compares two methods of carrying out the rapid agglutination test for *Br. abortus* infection on blood and milk. He finds that, whilst the tests give a useful indication of the extent of infection in a herd, they fail to pick out a proportion of the infected animals, and are thus not applicable to the eradication of the disease by segregation methods.

II. A description of an apparatus designed to deliver uniform drops of serum and, at the same time, to eliminate contamination of the serum when a long series of agglutination tests has to be carried out by the slide method. [The detailed description of the apparatus cannot be adequately abstracted].

III. D. describes a new method of reading the agglutination test for *Br. abortus*, whereby variations which arise in the readings of different investigators

using the same antigen can be reduced to a minimum. The result of any particular agglutination reaction is expressed as a " mean titre " (" mittlere Titre "), which is determined by multiplying the highest dilution showing complete agglutination by a series of geometrical factors corresponding to the dilutions showing only partial agglutination. D. explains in detail how these geometrical factors are obtained, and gives a table showing the " mean titres " for particular readings of the agglutination test. The " mean titre " is independent of the range of dilutions employed in the test, and smooths out slight variations in the agglutinin content of the serum.

IV. A rapid agglutination test for *Br. abortus* is described. One drop of oxalated blood is mixed with one drop of antigen on a glass slide. The mixture is then spread out over an area of 2 to 3 sq. cm. The appearance of bluish white floccules, either immediately or after warming, and leaving for three minutes, indicates the presence of agglutinins in the blood. Milk can be tested in a similar way by adding one drop of the antigen to four drops of milk.

V. A considerable error is involved in carrying out the agglutination test, and the authors illustrate the relative magnitude of error by the results obtained when two separate laboratories tested the same herd within eight days. The faults of the test may be " apparent ", *e.g.*, variation in the titre of an animal's sera at different times, or " real ", *e.g.*, use of different antigens by different laboratories, subjective differences in the persons reading the test, and inherent faults such as auto-agglutination. These faults thus limit the usefulness of the test, and E. and Z. think that, possibly, a complement-fixation test would give more consistent results.—N. J. Scorgie.

Garofolo, T. (1936). Enzoozia da b. paratifo B Breslavia in un allevamento di conigli. [**Infection of Rabbits with** *Salmonella typhi-murium*].—*Clin. vet., Milano.* **59.** 527-531. [3 refs.]

A description of an infection in rabbits caused by *S. typhi-murium*. The disease attacked pregnant females only and was usually revealed by abortion, followed by death of the doe ; some pregnant animals died without aborting.

The *post-mortem* lesions were those of acute septicaemia and necrosis of the uterine mucous membrane. The disease was regularly reproduced in pregnant rabbits and g. pigs, when they were infected with the organism isolated from the diseased animals.—K. D. Downham.

I. Gauger, H. C. (1936). **Rough Salmonella Pullorum Variants from Chicks.** —*J. agric. Res.* **53.** 235-238. 5 figs., 1 plate. [7 refs.]

II. Paille, R. (1936). La typhose aviaire. Etudiée spécialement chez les gallinacés. [**Fowl Typhoid**].—*Thesis, Lyons.* pp. 106. 1 text fig., 7 figs. on 3 plates. [Numerous refs.]

III. Rodrigues, C., & Pacheco, G. (1936). Biologie du groupe *pullorum-gallinarum*, relations antigéniques. [**The Antigenic Relationships of the** *pullorum-gallinarum* **Group**]. —*C. R. Soc. Biol. Paris.* **123.** 715-716. [2 refs.]

IV. Edgington, B. H. (1937). **Titre Fluctuation in Agglutination Tests for Pullorum Disease in Hens.**—*Poult. Sci.* **16.** 15-18. 2 tables. [8 refs.]

I. Two rough *S. pullorum* strains were isolated from three, seven-day-old chicks. On *post-mortem* examination the kidneys and ureters were swollen and congested, being distended with an abnormal amount of urates, the mucosa of the proventriculus was swollen and the liver was enlarged and showed yellow pin-point mottling.

Subcultures were made from the liver. Two types of colony were seen on

nutrient agar ; (1) extremely irregular, small colonies, and (2) a larger type which had a wavy border with a veined granular surface. Films from the former showed filaments which stretched across the field.

Both strains were agglutinated by *S. pullorum* serum, and both strains were salt-sensitive.

II. In this long thesis P. discusses fowl typhoid at considerable length, though he appears to combine the infections due to *S. pullorum* and *S. gallinarum* under one head. There are sections on the clinical aspect, *post-mortem* appearances, with illustrations, and on bacteriology, diagnosis, immunization and experimental studies.

III. Working with a gas-producing, a non-gas-producing and an intermediate strain of *S. pullorum*, and a strain of *S. gallinarum*, R. and P. endeavoured to find some serological differentiation between members of the group. They were unable to confirm the work of Aoki and Taganaiaki, who stated that *S. pullorum* possesses specific antigenic constituents. The antigenic analysis was performed by means of agglutination and agglutination absorption. R. and P. conclude that it is impossible to distinguish between members of the group by serological means.

IV. E. has attempted to ascertain what factors influence titre fluctuations to *S. pullorum* in cull and reactor birds placed as a group in a pen or separately in cages. Titre fluctuations were observed without relation to time, or to the method of housing. There appeared to be no significant difference in the titre variations between the two groups.—D. L. Hughes.

Winther, O. (1936). Om Betydningen af enkeltvis forekommende positive og mistaenkelige Reaktioner i Hønsebesaetninger undersøgte for Hønsetyfus ved Agglutinationsprøven. [**Significance of Some Positive and Erroneous Results of the Agglutination Test of Fowls for Fowl Typhoid**].—*Maanedsskr. Dyrlaeg.* **48.** 203-211. [18 refs.]

When examining a large number of flocks, it often happens that one or two reactors are found in a flock in which none were found in the course of previous examinations. Reacting hens from 148 flocks of this kind were called in for further serological and bacteriological examination. Most of them showed no evidence of infection. On the other hand, bacilli were often found in the organs of a bird that was the only reactor to a flock test, there having previously been reactors in the flock.—H. C. Bendixen (Copenhagen).

Dayus, C. V. (1937). **Vaccination of Ewes against " Pulpy Kidney " (Infectious Enterotoxaemia) in Lambs.**—*N.Z. J. Agric.* **54.** 65-70. 2 figs., 4 tables. [3 refs.]

A report of further trials of formalinized *Clostridium ovitoxicum* vaccine in the protection of lambs against pulpy kidney disease by administration to the ewes prior to lambing.

Vaccine prepared in the veterinary laboratory, Wallaceville, failed to protect in 0·306% of cases, while the losses in control lambs were shown to be 3·36%.

With a proprietary vaccine the losses amongst vaccinated stock were 1·92% as against 3·68% in the controls.—C. S. M. Hopkirk.

Underwood, E. J., & Shier, F. L. (1936). **Botulism in Sheep in Western Australia. Nutritional Experiments I.**—*Aust. J. exp. Biol. med. Sci.* **14.** 77-91. 7 tables. [12 refs.]

This article covers the same work as one published in a slightly more popular

form recently [*V. B.* **6.** 796]. Phosphatic licks given to sheep on a natural diet, containing, as far as could be ascertained, only from 0·12% to 0·15% P_2O_5 in the dry matter, had no effect on body weight, blood P levels or depraved appetite. —W. I. B. Beveridge.

Gordon, Ruth E., & Hagan, W. A. (1936). **A Study of Some Acid-Fast Actinomycetes from Soil with Special Reference to Pathogenicity for Animals.**—*J. infect. Dis.* **59.** 200-206. 1 fig., 1 table. [14 refs.]

Two known pathogenic strains of acid-fast *Actinomyces* isolated from lesions in man (*A. asteroides* and *A. gypsoides*) were compared with 11 strains of saprophytic acid-fast actinomyces, 3 of which were isolated from potato scab lesions and 8 from soil. There were no distinct microscopic or cultural differences between them and no features were found which would serve to distinguish the " pathogenic " types from the soil types. One of the soil types was highly virulent for rabbits on inoculation (intraven.), producing a disease which was not distinguishable from that produced by the " pathogenic " types. Rabbits died in one to two weeks, showing necrotic lesions in the lungs, liver, spleen, kidneys, heart and serous membranes, and the organisms were recovered in culture from the lesions. The soil types possessed little or no pathogenicity for g. pigs, whereas the " pathogenic " types produced fatal infections.—A. Robertson.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. Herrick, C. A., Ott, G. L., & Holmes, C. E. (1936). **Age as a Factor in the Development of Resistance of the Chicken to the Effects of the Protozoan Parasite** *Eimeria tenella.*—*J. Parasit.* **22.** 264-272. 1 fig., 1 table. [9 refs.]

II. Herrick, C. A., Ott, G. L., & Holmes, C. E. (1936). **The Chicken as a Carrier of the Oocysts of the Coccidia** *Eimeria tenella.*—*Poult. Sci.* **15.** 322-325. 1 table. [5 refs.]

III. Herrick, C. A., & Holmes, C. E. (1936). **Effects of Sulphur on Coccidiosis in Chickens.**—*Vet. Med.* **31.** 390-391. 2 tables. [1 ref.]

I. Sporulated oocysts of *E. tenella* were fed to groups of chickens varying in age from 14 days to 15 months. The number of oocysts fed varied from 200,000 for the younger birds up to one million for the oldest groups. The measures of resistance used were the change in the erythrocyte count and the mortality produced. In the birds under three months old there was marked decrease in the erythrocyte count and high mortality. Chickens older than three months were found to be quite susceptible to infection, but resistant to its effects. However, certain individual birds in the older groups developed the disease.

II. Fifteen chickens which had survived an experimental infection with *E. tenella* were killed and examined at intervals in the course of 12 months following infection. In all except two, viable oocysts were found in the caecal pouches up to seven and a half months after infection. After seven and a half months no viable oocysts could be found. Strict precautions against reinfection had been maintained and control chickens kept under the same conditions remained healthy.

III. Sulphur added to the mash in the proportion of 5% and 10% during a period of three weeks was found to increase the resistance of chicks subsequently infected with coccidia. The severity of the disease was slighter and the mortality lower in the sulphur-treated chicks than in control chicks. In a second experiment it was found that the addition of 20% of sulphur to the mash for six days prevented

infection and did not cause the irritation of the cloaca produced by more prolonged feeding. No effect on the disease was produced when sulphur was fed after infection with coccidia.—C. McG.

I. Bevan, L. E. W. (1936). **Trypanosomiasis Research in Southern Rhodesia.** —*Vet. Rec.* **48.** 1273-1275.

II. Duke, H. L. (1936). **Recent Observations on the Biology of the Trypanosomes of Man in Africa.**—*Trans. R. Soc. trop. Med. Hyg.* **30.** 275-308. [Numerous refs.]

III. Corson, J. F. (1936). **Are Experiments with Trypanosomes in Laboratories in Tropical Africa Vitiated by Accidental Infections ?**—*Ibid.* 309-312. [9 refs.]

I. B. suggests that the trypanosome of man in Southern Rhodesia is transmitted by *G. morsitans* from man to man, and not from game to man. Discussing immunity and treatment, he refers to the tolerance that can be produced in young rats by superinfection [*V. B.* **5.** 217.] and in cattle by treatment with tartar emetic. An immunity based on tolerance is, however, liable to breakdown, and tolerant animals are carriers of trypanosomes and remain a potential source of fly infection. If a method could be devised of creating sterile immunity to protozoan diseases, the future of Central Africa would be assured. If carriers of human infection were detected and removed to clean areas, and if domestic stock were suitably treated and nourished, trypanosomiasis could be controlled, but satisfactory progress in development depends on the vigorous prosecution of research.

II. D. discusses the origin of *Tryp. rhodesiense* and its relationship to *Tryp. brucei*. All experimental attempts to infect man with *Tryp. brucei* have failed. As regards the behaviour of man's trypanosomes in animals, *Tryp. gambiense* readily infects goats and sheep, and the transmissibility of a strain maintained in sheep may persist for 15 months. Calves appear to be unsuitable hosts for this trypanosome.

Tryp. rhodesiense has a high virulence for sheep and goats, but one instance of its survival in cattle for 294 days is on record, without loss of pathogenicity for man. The role of cattle as carriers of trypanosomes pathogenic for man is reduced, as they are very susceptible to *Tryp. congolense* and cannot survive in a fly belt. In game, mild strains of *Tryp. gambiense* only survive for a limited period. *Tryp. rhodesiense* will survive in game, but strains of this trypanosome vary in their power of retaining their virulence for man, and in several instances, strains transmitted cyclically from antelope had lost their infectivity for man, though the same strain passed through a monkey proved infective. D. considers that where man is exposed in nature to tsetse of game carrying *Tryp. brucei* there is a liability for the trypanosome to establish itself in man, either in a mild or a virulent form.

III. C. discusses the provision of clean animals for experimental purposes in tropical laboratories, and the difficulty of excluding animals carrying latent infections. He instances the extreme chronicity that may occur in *Tryp. brucei* infections, but considers that, if animals are bought from known owners near the laboratory, are kept for some time before use, and no accidental infection is found in the course of years, it is justifiable to conclude that the animals are free from latent infection. Mechanical transmission of trypanosome infections by flies is discussed, but it is considered that no accidental infection by this means has occurred at the Tinde laboratory.—U. F. Richardson.

Kligler, I. J., & Olitzki, L. (1936). **The Antigenic Composition of *Trypanosoma evansi*.**—*Ann. trop. Med. Parasit.* **30.** 287-291. 1 table. [6 refs.]

Tryp. evansi were obtained in large numbers from infected rats by centrifugation of blood, and submitted to chemical analysis by which four fractions were obtained, alcohol soluble, ether soluble, protein residue and carbohydrate residue. Nearly 60% of the trypanosome cell is lipoidal in nature, and only from 2 to 6% is carbohydrate, whilst bacterial cells contain from 12 to 15% lipoids, and from 14 to 16% carbohydrate. It is suggested that the antigenic peculiarities of trypanosomes can be ascribed to their lipoid content.—U. F. Richardson.

I. Sen, S. K. (1936). **The Curative Treatment of Surra in Bovines.**—*Indian J. vet. Sci.* **6.** 215-233. 2 text figs., 2 figs. on 1 plate, 2 tables. [Num. refs.]

II. Singh, B. (1936). **Bovine Trypanosomiasis in Central Provinces with an Account of Some Recent Outbreaks.**—*Ibid.* 243-250. 5 figs. on 2 plates, 5 tables, 1 map. [6 refs.]

III. Jacotot, H. (1936). Recherches sur la prévention et la traitement du surra. [**Prevention and Treatment of Surra**].—*Arch. Inst. Pasteur Indochine.* **6.** 189-233. 4 tables. [Numerous refs.]

I. S. records experiments undertaken to ascertain if Indian cattle for export could be certified free from surra and, more particularly, whether treatment with " naganol " results in a sterile cure. Controlled experiments were undertaken in which " naganol " was employed at a dose of 5 g. per 1,000 lb. body weight, freedom from infection being judged by failure to detect trypanosomes microscopically in fresh blood films on daily examination for six months followed by weekly examinations for a year, failure to infect rabbits by the subinoculation of 5 c.c. of blood, and failure to infect horses with 200 c.c. of blood. The dose used, judged by these criteria, was able to sterilize the system, but S. suggests that it might be safer to repeat it two or three times. The observations on the controls are of interest in that it appeared that the subinoculation of rabbits was not reliable as a means of judging freedom from infection, and in that infection could not be detected in the control animals six months after the completion of the treatment.

II. Attention is drawn to reports of heavy mortality from surra occurring in Indian cattle, and particulars are given of observations on several outbreaks of this nature occurring in the Central Provinces. Cattle, buffaloes and ponies were found to be infected with *Tryp. evansi*, but the working bullocks suffered the heaviest losses, the disease running an acute course and sometimes causing a loss of 90% in this class of animal. The disease might prove fatal within 24 hours. Outbreaks are most prevalent in low-lying areas during the rains, the heaviest mortality occurring from August to September.

Tartar emetic given (intraven.) in doses of from 10 to 15 grains proved successful in the treatment of acute cases, if given in the early stages, but was not effective in the treatment of the chronic form of the disease.

III. J. records the results of experiments undertaken to ascertain the preventive and curative value of " naganol " against surra infection of horses in Indo-China. " Naganol " in a dose of 1·5 g. was not reliable as a preventive when tested by the subcut. inoculation of trypanosomes two or three weeks later. Doses of 2, 3, or 4 g. were protective and J. concluded that the period of protection varied with the dose of the drug. As it was considered that large doses were injurious to the kidneys, two doses of 2·5 g. given at intervals of a week were tested, and this appeared to give protection up to five months. Very small doses of " naganol " (0·75 g.) are sufficient to cure recently infected horses, but if the disease has become established, larger doses are required. The treatment recommended for the average case encountered in practice is from 1 to 2 g. " naganol " followed, two

or three times at intervals of a week, by doses of 2 g. A few cases were encountered which failed to respond to " naganol " treatment. A limited number of experiments were undertaken in which other drugs, such as " sulpharsenol ", and the sera of recovered animals were employed in addition to the regular " naganol " treatment, but no better results were obtained.

After the first treatment with " naganol ", trypanosomes could not be detected in the blood by either microscopic examination or by subinoculation, but in those cases which failed to respond to treatment they might be detectable by subinoculation within a week, though microscopic examination remained negative. Horses cured by treatment acquired some immunity, but this rapidly disappeared, and probably depended on the protection given by the drug. A limited number of buffaloes and cattle were also treated, apparently with success.—U. F. Richardson.

I. Stewart, J. L. (1936). **Porcine Trypanosomiasis in the Gold Coast.**—*Trans. R. Soc. trop. Med. Hyg.* **30.** 313-314. [2 refs.]

II. Hoare, C. A. (1936). **Note on *Trypanosoma simiae* from an Outbreak amongst Pigs in the Gold Coast.**—*Ibid.* 315-316. 4 figs., 1 table. [3 refs.]

I. S. records that *Tryp. brucei* and *Tryp. congolense* infection of pigs occur in the Gold Coast associated with verminous pneumonia. One outbreak of *Tryp. simiae* infection has been encountered, in which 100 out of 150 pigs died within a few weeks. One animal under observation began to shiver and died within 20 minutes of the onset of symptoms. Other animals were reported to have died in the same way.

II. H. compares the morphology of *Tryp. simiae* of the Gold Coast with the similar trypanosome of East Africa [*V. B.* **6.** 860]. Only 0·8 % of organisms in preparations from the Gold Coast exhibited a free flagellum. H. considers that this apparent difference is due to the fact that the Gold Coast smears were recent and well stained, whilst the East African smears were several years old.—U. F. R.

Rodhain, J., & Henry, E. (1936). Localisation cutanée du *Trypanosoma marocanum* chez le cobaye. [**Cutaneous Localization of *Tryp. marocanum* in the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **121.** 1388-1390. 2 figs. [1 ref.]

Further observations on the invasion of the dermis of g. pigs by *Tryp. marocanum* [*Tryp. evansi*] are recorded. This trypanosome usually causes an acute disease in g. pigs, but, by treatment with 0·2 to 0·3 c.c. of " neoantimosan ", a chronic disease can be produced, in the later stages of which preparations made from the dermis may show numerous trypanosomes, though blood smears are negative. Invasion of the dermis appears to be associated with traumatic injury, accumulations of trypanosomes occurring at places where the skin had been injured.—U. F. Richardson.

Launoy, L., & Lagodsky, H. (1936). Les mononucléaires à corps de Kurloff dans l'infection expérimentale du cobaye par *Trypanosoma annamense*. [**Kurloff Bodies in *Tryp. annamense* Infection in the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **122.** 539-541. 1 table. [3 refs.]

The authors discuss the effect of *Tryp. annamense* [*Tryp. evansi*] infection on the prevalence of Kurloff bodies in the white corpuscles of g. pigs. A decrease in the number of bodies occurred before the appearance of trypanosomes in the blood, and nine to ten days after infection the decrease had become so marked that the bodies might be difficult to detect. In some cases there was a reappearance of Kurloff bodies towards the end of the infection.—U. F. Richardson.

Pannier, R. (1936). Essai de culture de *Trypanosoma lewisi* dans le latex d'*Euphorbia characias* et *Euphorbia esula*. [**Attempts to Cultivate *Tryp. lewisi* in the Latex of Euphorbia**].—*C. R. Soc. Biol. Paris.* **122.** 29-30. [2 refs.]

P. records the cultivation of *Tryp. lewisi* in media composed of varying quantities of euphorbia latex and N.N.N. medium. The efficiency of the medium was limited by the difficulty of avoiding bacterial contamination. Too great a proportion of euphorbia latex reduced its suitability.—U. F. Richardson.

Nattan-Larrier, L., & Dufour, J. (1936). Les variations morphologiques de *Trypanosoma rabinowitchi* dans les cultures sur milieu solide. [**Morphological Variations of *Tryp. rabinowitchi* on Solid Media**].—*C. R. Soc. Biol. Paris.* **122.** 514-517. [3 refs.]

The authors record that in cultures of *Tryp. rabinowitchi*, grown in rabbit blood agar for three years, the colonies tended to spread over the surface of the medium instead of remaining discrete. They remained rounded but the edges became more irregular. After six months growth of these old cultivated strains, fresh preparations showed motile flagellates and rounded non-motile forms. A small number of metacyclic forms occurred. The authors consider that with prolonged cultivation on solid media the organisms tend to return to the form which occurs in lice.—U. F. Richardson.

Lourie, E. M., & O'Connor, R. J. (1936). **Trypanolysis *in vitro* by Mouse Immune Serum.**—*Ann. trop. Med. Parasit.* **30.** 365-388. 11 tables. [Numerous refs.]

It has previously been accepted that trypanolysis is not caused by immune mouse serum, owing to the absence of complement in mouse blood, but the authors record that trypanolysis by immune mouse blood can be readily demonstrated at a temperature of 37° C., even in the absence of complement, though the action is then retarded.

It was noted that mice cured of *Tryp. rhodesiense* and other trypanosome infections with " halarsol " exhibited immunity for as long as eight months, though reinfection could be produced by the administration of a large dose (160,000) of organisms.—U. F. Richardson.

Brug, S. L. (1936). **A Simple Method of plotting Logarithmic Growth-Curves of Protozoal Cultures.**—*Ann. trop. Med. Parasit.* **30.** 357-359. 1 table, 1 graph.

B. has devised a convenient method for plotting logarithmic curves of the growth of intestinal protozoa in large cultures. He uses paper ruled in square millimetres and, to minimize calculation, he has composed a table of logarithms (with 2 as a base) which are rounded off to 0·5 mm. on ordinary axis, *i.e.*, to half the first decimal of the mantissa. There is a maximal error of 1·7 %.—C. H.-Smith.

DISEASES CAUSED BY VIRUSES.

Burnet, F. M. (1936). **Virus Diseases : the Present Position.**—*Med. J. Aust.* August 1st. 164-167.

This review is intended to give the medical practitioner a conception of the present position of investigation into virus diseases. It is considered probable that a method will shortly be available for immunizing human beings against true

epidemic influenza, but it is not thought that this is likely to be capable of preventing the epidemics, owing to practical difficulties. The possibility of natural epidemic immunization by a highly contagious but symptomless strain is mentioned, though this is admittedly in the realm of fantasy. The diseases of which man is the primary host will probably never be eliminated and the raising of the standards of nutrition and hygiene is more likely to influence the death rates from these infections than any specifically immunological measures.—W. I. B. Beveridge.

Findlay, G. M. (1936). **Variation in Animal Viruses. A Review.**—*J.R. micr. Soc.* **56.** 213-299. 1 table. [Numerous refs.]

In this important and well-documented review, F. has dealt with the nature of variation in viruses, with particular reference to the question as to whether virus variants show analogies with the mutations observed in bacteria and protozoa and in the members of the higher world. It is not yet known whether or not fluctuations can evoke viable, hereditable variants, and the arguments for and against are carefully analysed. The diseases of veterinary interest which are considered in detail are:- the mammalian pox virus diseases, rabies, equine encephalomyelitis, vesicular stomatitis, Rift Valley fever, horse-sickness, F. & M. disease, rinderpest, swine fever and certain diseases of fowls. It is not possible to give an adequate abstract of this article, which should be read in the original, but the final conclusions may be cited.

" 1. Variations are described in a number of animal viruses.

2. The variants observed are of two types :–

(*a*) Variants associated with pathological lesions unlike those produced by the parent strains, but without any great antigenic difference.

(*b*) Variants associated with pathological lesions like those produced by the parent strains, but with considerable antigenic difference ; the antigenic differences being as a rule quantitative rather than qualitative in character.

3. Both types either occur naturally or can be produced artificially under laboratory conditions. If a variant virus exhibits a high degree of antigenic difference, and at the same time produces new pathological lesions, an apparently new disease entity has arisen.

4. Virus variants may appear as a result of growth in (*a*) the same species and the same tissue, more commonly either in (*b*) the same species and a different tissue or in (*c*) a different species and a different tissue.

5. When virus variants appear in the same species and the same tissue no explanation is forthcoming as to why the variants should become dominant.

6. No essential difference is to be found between the variations of animal viruses and those occurring in unicellular and multicellular organisms.

7. It is suggested that certain virus variants are true mutations, others are akin to *Dauermodifikationen*, though in viruses, where there seems little or no possibility of contrasted parts corresponding to nucleus and cytoplasm, the distinction between Lamarckian and genetic variation virtually breaks down.

8. The occurrence of virus variants throws light on the nature of animal viruses, for it is difficult to explain the variations observed except by regarding viruses as organised living entities ".

—R. E. Glover.

I. French, M. H. (1936). **The Protein Changes in Ox Serum Induced by Hyperimmunisation against Rinderpest Virus.**—*J. comp. Path.* **49.** 226-245. 25 tables. [Numerous refs.]

II. French, M. H. (1936). **The Serum Protein Changes during the Immunisation of Goats against Rinderpest Virus.**—*Ibid.* 246-250. 4 tables. [19 refs.]

I. Experiments on oxen showed that an increase of total protein, total globulin, euglobulin, and globulin insoluble in saturated NaCl resulted from intramuscular hyperimmunization of cattle against rinderpest virus. The relative increase of the more insoluble globulins was of the same order of magnitude as

that obtained for cattle successfully hyperimmunized by the subcutaneous route. In most cases there was a slight increase of the pseudoglobulin as well as the normal increase of euglobulin after hyperimmunization.

It was found that the increases in the serum proteins were greater and more constant in intramuscularly hyperimmunized cattle than in those hyperimmunized by introduction of virus into the rumen with either virulent blood or extracts of virus-containing organs, although in some cases the increases after intrarumenal injection were as great as those obtained with the intramuscular technique.

In so far as globulin increase may be indicative of antibody formation, the results support the view that antisera made by the intrarumenal method are inferior to those prepared by the more established techniques.

II. The figures indicated that the total proteins of goat serum fell temporarily during immunization, but later returned to a high level. The total globulins did not show a similar constant fall, but in every case a high level was reached by the end of the second week after infection. The albumin content fell to about the end of the second week and then rose slowly.

The changes in the euglobulin content were not quite uniform ; a temporary drop sometimes occurred but in all cases the content increased at the end of a fortnight. The pseudoglobulin changes were similar but much greater than for the euglobulin fraction.

These results indicate that the antiviral body is spread over a wider serum protein range than in the ox.—R. Allcroft.

Balozet, L. (1936). Action de la glycérine sur la virulence de la rate dans l'anémie infectieuse. [**The Action of Glycerin on the Virulence of the Spleen in Equine Infectious Anaemia**].—*C. R. Soc. Biol. Paris.* **122.** 283-285. [2 refs.]

A note regarding the attenuation of virus summarized from one section of a previous publication [*V. B.* **5.** 810]. Of various chemical agents tested, glycerin alone produced a satisfactory type of attenuation of virus such as might be applicable to field immunization. Admixture with an equal quantity of glycerin was followed by preservation with a gradual diminution of virulence of the virus noticeable after four months.—E. J. Pullinger.

Cuverkalov, D., & Kučerenko, I. (1935). Biochimičeskij sostav krovi, porazennoj filtrujuscimsja virusom čumi svinej, v različnie sroki ee chranenija. [**Composition of Swine-Fever-Virus Blood after Preservation**].—*Trud. vsesojuz. Inst. eksp. Vet.* **10.** 80-84. 2 figs., 1 table. [French summary].

C. and K. chemically analysed virulent swine-fever blood, preserved for various periods, in order to determine the biochemical changes which take place in it during preservation, and to ascertain why, after a certain time, it becomes unsuitable for use in vaccination.

Basing their decision to do so on the results of former investigations, they concentrated on the glycolytic processes taking place in virulent swine-fever blood when preserved. They studied its sugar content and the products of the sugar disintegration, lactic acid, CO_2, reserve alkalinity and the active reaction of the medium. They found that the older the virulent blood the greater were its sugar and lactic acid contents and the smaller its reserve alkalinity. They consider that it is generally possible to estimate with a certain degree of accuracy the virulence of preserved swine-fever blood by determining its content of the above-mentioned components. They add, however, that the matter requires further investigation.

HOFFMAN, F. (1936). Takarmányozási és tartási zavarok okozta malacbetegségek és a védoojtások. [**Influence of Diet and Management on Swine Fever and Immunization**].—*Állatorv. Lapok.* **59.** 158-159.

A group of apparently healthy pigs, three to four and a half months old, were subjected to serum-virus inoculation against swine fever. Six to seven days later, most of them sickened, and by the 22nd day after inoculation 20% had died. Bacteriological examination of several carcasses gave pure cultures of *Salmonella cholerae-suis*. Of another similar group of 91 pigs, which were inoculated with the same serum and virus, none sickened. Investigation revealed that, after inoculation, ground maize and barley mixed with milk and 2% of $CaCO_3$ had been added to the usual feed of the first group, while the second group had been given its ordinary mixed feed and sent out to pasture. H. considers that the unsuitable addition to the feed of the first group, combined with the effects of inoculation, weakened resistance, enabling a latent infection to develop.

KUTSCHERENKO, J. J. (1936). Zur Serodiagnostik der Virusschweinepest. [**Serodiagnosis of Swine Fever**].—*Z. InfektKr. Haustiere.* **49.** 246-255. 3 tables. [1 ref.]

K. describes the process whereby, using the urine of swine artificially infected with swine fever, he obtained antigens suitable for immunizing rabbits, in order to produce blood serum containing sufficient precipitin antibodies to be used in diagnostic work. The dose of antigen was from 1 to 2·5 c.c. and the number of injections varied between 10 and 26. K. maintains that precipitin accumulation in rabbit serum depends absolutely upon the number of injections.

Having tested the sera obtained on artificially infected swine, K. then carried out diagnostic experiments (including some *post-mortem* examinations) on animals from different farms. He claims that the results were satisfactory except when skin extracts were used in place of urine.—M. BURKE.

I. LÓPEZ, C., STEINER, A., & GORDÓN, S. (1936). Recherches sur la vaccination contre la peste porcine. [**Vaccination against Swine Fever**].—*Rev. gén. Méd. vét.* **45.** 513-517.

II. ANON. (1936). Le diagnostic de la peste porcine en France et en Afrique du Nord. Méthodes classiques et méthode nouvelle. [**The Diagnosis of Swine Fever in France and North Africa**].—*Bull. Acad. vét. Fr.* **9.** 251-257.

III. JACOTOT, H. (1936). La peste porcine est transmissible au mouton et à la chèvre. [**Swine Fever is Transmissible to Sheep and Goats**].—*C. R. Acad. Sci., Paris.* **203.** 1297-1299. [2 refs.]

I. The authors consider that it is possible to produce immunity to S. F. by use of a dead virus combined with certain bacteria or other reagents, but the method is somewhat uncertain in its results. Trypan blue, inoculated at the same time as virus or 24 hours later, has no effect on the normal development of the disease.

They experimented with a saponified vaccine which they term "Vaccine O.L.". The results were very promising. The inoculated animals proved resistant to infection by direct transmission, by contact with affected, or by the ingestion of infected material. Immunity was established within 12 or 14 days. Details are furnished of 12 inoculation experiments.

The method of preparation of the vaccine is not given.

II. A review of a memoir [the name of the author is not given] on swine fever dealing with the various means for the diagnosis of the disease, namely epidemiological, clinical, pathological, bacteriological and others. The views of

the author in regard to these are briefly considered. There is a note on a method of diagnosis based upon the results of the inoculation of healthy pigs with material taken from doubtful cases of the disease, and also some observations on an intradermal allergic test for the disease.

III. J. carried out certain experiments on the transmissibility of swine fever to sheep and goats. He found infection of these animals to be easy. The reaction, however, in the majority of cases was mainly symptomless, irrespective of whether inoculation was made by the subcutaneous route, into the testicles, the brain, or *per os*. Direct transmission could also be effected through the association of healthy sheep and goats with affected pigs. The virus was recoverable up to three weeks after inoculation and subsequent reinfection of the animals proved impossible. Repeated transmission of virus from sheep to sheep or goat to goat caused no reduction in the pathogenicity of the virus for the pig.—C. DAVENPORT.

I. WALDMANN. (1936). Epidemiologie und Bekämpfung der Ferkelgrippe. [**Epidemiology and Control of Piglet Influenza**].—*Dtsch. tierärztl. Wschr.* **44.** 847-850. 2 figs., 1 chart. [1 ref.]

II. DOBBERSTEIN. (1936). Die pathologische Anatomie der Ferkelgrippe. [**Pathology of Piglet Influenza**].—*Ibid.* 850-851.

I. The aetiology and pathogenesis of piglet influenza are reviewed and it is stressed that this disease constitutes a serious economic problem in Germany. Control methods depend upon the strong natural resistance to the disease developed by piglets when a few weeks old, and should be aimed at protecting the animals during the first few weeks of life. For this reason active immunization is too slow a procedure and passive immunization has proved unsatisfactory. Control should consist of avoiding introduction of infection into clean herds, the segregation of infected and in-contact animals and the maintenance of a high standard of hygiene. The comparative value of two types of sty for withstanding adverse climatic conditions is discussed.

II. The characteristic lesions of the pure virus infection are bronchitis and bronchiolitis, sometimes followed by atelectasis. Inflammation of the alveolar tissue of the lungs is due to secondary invaders.—E. J. PULLINGER.

I. PEARCE, Louise, ROSAHN, P. D., & HU, C. K. (1936). **Studies on the Etiology of Rabbit Pox. I. Isolation of a Filterable Agent : its Pathogenic Properties.**—*J. exp. Med.* **63.** 241-258. 1 text fig., 3 figs. on 1 plate, 2 tables. [8 refs.]

II. ROSAHN, P. D., HU, C. K., & PEARCE, Louise. (1936). **Studies on the Etiology of Rabbit Pox. II. Clinical Characteristics of the Experimentally induced Disease.**—*Ibid.* 259-276. 18 figs. on 3 plates, 1 table. [3 refs.]

III. HU, C. K., ROSAHN, P. D., & PEARCE, Louise. (1936). **Studies on the Etiology of Rabbit Pox. III. Tests of the Relation of Rabbit Pox Virus to Other Viruses by Crossed Inoculation and Exposure Experiments.**—*Ibid.* 353-378. 10 figs. on 2 plates, 4 tables. [5 refs.]

IV. ROSAHN, P. D., HU, C. K., & PEARCE, Louise. (1936). **Studies on the Etiology of Rabbit Pox. IV. Tests on the Relation of Rabbit Pox Virus to Other Viruses by Serum Neutralization Experiments.**—*Ibid.* 379-396. 4 figs. on 1 plate, 4 tables. [3 refs.]

V. PEARCE, Louise, ROSAHN, P. D., & HU, C. K. (1936). **Studies on the Etiology of Rabbit Pox. V. Studies on Species Susceptibility to Rabbit Pox Virus.**—*Ibid.* 491-507. 4 figs. on 1 plate. [11 refs.]

VI. ROSAHN, P. D., HU, C. K., & PEARCE, Louise. (1936). **The Reaction of**

Normal and Rabbit Pox Immune Adult Rabbits to Vaccination with Vaccine Virus.—*J. Immunol.* **31.** 59-71. 2 tables. [7 refs.]

VII. Pearce, Louise, Hu, C.K., & Rosahn, P. D. (1936). **The Reaction of the Nursling Rabbit to Vaccination with Vaccine Virus.**—*Ibid.* 73-94. 5 tables, 1 chart. [8 refs.]

A series of investigations concerning a highly contagious and fatal epidemic which occurred in a rabbit-breeding colony at the Rockefeller Institute in 1932. Of 1,400 rabbits, 46% succumbed, the death rate being highest in young rabbits.

I. The isolation of a filtrable virus is reported and experiments dealing with serial passage and pathogenic properties are recorded. The reaction produced by rabbit inoculation was of two types. The acute fulminating and rapidly fatal type is described in this paper.

II. A description of a more prolonged and less fatal disease which was observed in connexion with a small dosage, and routes of injection other than the intratesticular.

III. In this paper, which is chiefly of an immunological nature, it is shown that there is a close relationship between rabbit pox virus, vaccine virus and neuro-vaccine virus.

IV. It is shown that the relationship between rabbit pox and vaccine virus is confirmed by serum neutralization tests, but their identity could not be established. The prophylactic use of vaccine virus was indicated.

V. The authors state that the white mouse, g. pig, calf and, probably, the rat are susceptible to infection with the virus of rabbit pox. Consideration of the evidence revealed in these investigations inclined the authors to the view that rabbit pox is a disease entity and not a variant or mutant of vaccinia.

VI. As rabbit pox again made its appearance in the colony ten months later, the rabbits were vaccinated with vaccine virus. In this paper the results in adult rabbits are discussed. 87·6% of the presumably susceptible animals gave clinical evidence of susceptibility in the form of local or generalized lesions following vaccination, whereas 92·3% of the rabbits recovered from infection during the previous outbreak were refractory.

VII. The results of vaccination in the young rabbits are recorded. The chief observation made is that susceptibility to vaccine virus is not necessarily associated with the development of a local reaction. A negative response was frequent in young and new-born animals.—Gwilym O. Davies.

Manninger, R. (1936). **Fowl Plague and Newcastle Disease.**—*J. comp. Path.* **49.** 279-283. 2 tables. [10 refs.]

M. comments on Doyle's criticisms of his previous publication and gives details of further experiments which he has carried out on the lines suggested by Doyle. He states that the results added further support to his contention that Newcastle disease and the classical fowl plague represent a single aetiological entity though they differ in their clinical manifestations.

M. maintains, contrary to Doyle's opinion, that the pigeon test is not a reliable means of distinguishing the two viruses. Furthermore, neutralization tests also fail to distinguish them. Regarding Doyle's inability to exalt the Newcastle disease virus in order to produce results comparable to fowl plague, M. states that this was probably due to the time at which Doyle chose to passage the virus – at a later stage.

He concludes by stating that Nakamura, Oyama, and Tomonaga [(1932). *J. Jap. Soc. vet. Sci.* **11.** 285.] have succeeded in modifying the Newcastle disease virus and that Fukushima [*V. B.* **4.** 519.] maintains that there is no difference

between the viruses even with regard to *post-mortem* lesions and histological changes. [Manninger's contention that fowl plague and Newcastle disease are caused by the same virus is contrary to the findings of Picard (1928) and (1934), Radier (1928), Nonno, Ochi and Hashimoto (1929), Farinas (1930), Cooper (1931), and Burnet and Feiry (1934)].—Gwilym O. Davies.

PARASITES IN RELATION TO DISEASE (ARTHROPODS).

Hobson, R. P. (1936). **Sheep Blow-Fly Investigations. III. Observations on the Chemotropism of *Lucilia sericata* Mg. IV. On the Chemistry of the Fleece with Reference to the Susceptibility of Sheep to Blow-Fly Attack.** —*Ann. appl. Biol.* **23.** 845-851 and 852-861. 12 tables. [10 refs.] [See also *V. B.* **6.** 140].

Part III records experiments, further to those already noticed, on the chemical stimuli which induce *L. sericata* to oviposit on sheep. Ammonium carbonate, indole and skatole caused oviposition by blowflies when cottonwool soaked with the solution was placed in the wool of live sheep. Apart from the body of the sheep, the substances were not attractive to blowflies. From this it is inferred that oviposition is due to a dual stimulus supplied by the " putrefactive factor " – represented by the products of decomposition – and an undetermined " sheep factor ".

Individual sheep were found to vary in their attractiveness to blowflies, and by the use of a standard attractant this variation in the " sheep factor " can now be measured. The method also allows of the accurate and rapid testing of fly-repellent dressings. Some preliminary tests of repellents are recorded.

In part IV the author describes the analysis of wool samples from Welsh Mountain ewes and lambs, for pH value, water-soluble matter, and grease content. The distribution of suint over the body showed no correlation with the susceptibility of different areas to fly-strike. Comparison of the suint content of struck sheep and controls gave inconclusive results.

The pH value appeared to vary in accordance with the suint content ; both were higher on the flank and breast than along the back. The grease content was fairly uniform over the back and flanks. The suint content decreased, and the grease content increased, from the base to the tip of the wool staple.

The evidence is discussed in relation to the Australian theory that the suint content is an index of susceptibility to strike.—J. MacLeod.

Cameron, A. E. (1935). **The Cleg (*Haematopota pluvialis*) and Other Horse-Flies.**—*Trans. Highl. agric. Soc. Scot.* **47.** 94-110. 8 figs. [8 refs.]

A general account of the bionomics of the horse-fly, *Haematopota pluvialis*, in Scotland, based on the author's study of this and related species in Scotland and Western Canada. The method of egg-laying is described, and the eggs, larvae, and pupae are described and figured. From 6 to 9 moults occur in the larval stage, which lasts from 10 to 22 months. The factors determining whether the life-history will be completed in one or two years are unknown ; they do not appear to be related to heredity or breeding conditions.

Egg-laying has not been observed in nature. The larvae, which are carnivorous and cannibalistic, have been recovered in nature from the soil of cultivated ground, pasture, and marsh, and from rotten wood. The pupa moults in the soil after three weeks. The adult is found on the wing from June to August, and is usually active on warm sunny days, with temperatures of 65°-70°F. The females attack

human beings, cattle and horses. Observations on the mode of feeding, and on the amount of the blood meal, are recorded.

The possibilities of control are discussed, and details given of repellent dressings used in the U.S.A. The use of protective nets for working horses, and of shelters for animals at pasture is suggested.—J. MACLEOD.

PARASITES IN RELATION TO DISEASE (HELMINTHS).

HSÜ, H. F. (1936). **Check List. Parasitic Helminths of Animals and Man in China.**—*Chin. med. J.* Suppl. 1. pp. 457-473. [In English].

This check list, the instalment in this number being the first of a series, is arranged in accordance with the classification of the parasitic helminths. The names of the parasite and of the host or hosts are given, the location, the locality and references to the relevant literature. The cestodes only are dealt with in this first instalment. Other groups of helminths will be dealt with later, together with a check list of hosts and a bibliography.—E. L. TAYLOR.

I. WOLFFHÜGEL, K. (1935). Zu " Almarza N. : Die Leberegel des Schafes ". [**On Almarza's Article " The Sheep Liver Fluke "**].—*Z. InfektKr. Haustiere.* **48.** 196-198. [1 ref.] [See also *V. B.* **5.** 823].

II. ONO, S. (1935). **Studies on the Trematodes invading** *Lymnaea* **Snails as the First Intermediate Hosts, found in the Vicinity of Mukden. II. On the Encystation and Development of** *Echinostomidae*.—*J. Jap. Soc. vet. Sci.* **14.** 232-246. 1 text fig., 16 figs. on 4 plates, 7 tables. [5 refs.] [In Japanese : abst. from English summary]. [See also *V. B.* **5.** 563].

III. KOMIYA, Y., & KAWANA, H. (1936). **Study on Clonorchis sinensis in the District of Shanghai. 4. The Second Intermediate Hosts of Clonorchis.**—*J. Shanghai Sci. Inst.* Sect. IV. **2.** 155-167. 3 figs. on 3 plates, 16 tables. [18 refs.] [In English].

IV. MAROTEL. (1936). Un nouveau parasite, une nouvelle maladie : la distomatose intestinale porcine. [**A New Parasite and the Disease of Swine which it causes**].—*Rev. vét., Toulouse.* **88.** 130-133. 2 figs.

V. HEIDEGGER, E. (1936). Die Egelseuche des Geflügels in Bayern. [**Fluke Infestation of Poultry in Bavaria**].—*Münch. tierärztl. Wschr.* **87.** 325-329. 1 text fig., 8 figs. on 2 plates. [8 refs.]

VI. SWALES, W. E. (1936). **Further Studies on** *Fascioloides magna* **(Bassi 1875) Ward, 1917, as a Parasite of Ruminants.**—*Canad. J. Res. Sect. D.* **14.** 83-95. 17 figs. on 3 plates, 1 table. [15 refs.]

VII. KAO, L. S., & WU, K. (1936). **Preliminary Report on the Histopathology of Paragonimiasis in Cats in China.**—*Chin. med. J.* Suppl. 1. pp. 101-105. 6 figs. on 3 plates. [In English].

I. This paper calls attention to the incorrect nature of the statements made in Almarza's paper, in which no less than seven species of trematode were reported to have occurred in a flock of sheep in Spain. In the author's opinion, the only two species which occurred were *Fasciola hepatica* and *Dicrocoelium dendriticum*.

II. Encysted echinostome larvae were found in all of 122 specimens of *Lymnaea*, 81 of which also harboured cercariae of Echinostomidae, Plagiorchiidae or Schistosomatidae. This showed that a previous infection does not make the snails resistant. Chickens were experimentally infected and the adult flukes which developed were found to belong to *E. paryphium* and *E. revoltum*. An experimental duck was also infected and adult specimens of *E. revoltum* and also *E. gotei*

were recovered. A living specimen of *Hymenolepis* sp. was actually found within the intestine of one *E. gotei*.

III. Forty species of fish are known to be capable of acting as the second-intermediate host for *Clonorchis sinensis*. The authors fed 15 species on g. pigs, rabbits and puppies. Ten proved to carry infection; three of these had not previously been recorded as suitable intermediate hosts.

IV. A disease recently appeared among the pigs in a certain district of Tunis and in the space of two months some 400 out of 1,200 pigs died. Examination of the small intestine, which was greatly inflamed, revealed the presence of numerous small distomes of the genus *Harmostomum*, some 10 or 20 individuals being present in each square centimetre. An account is given of the characters of the fluke, which appears to be a hitherto unknown species, and the name *H. suis* is proposed for its reception.

V. A brief account of what is known of prosthogonimiasis, the flukes which cause it, and the intermediate-host dragon-flies. The disease is particularly troublesome in some parts of Bavaria in the vicinity of lakes and ponds, and a few notes on one or two outbreaks of the disease, which have come under the personal observation of the author, are given at the end of the paper.

VI. Swales here gives an account of further observations on the responses of the liver tissues of various host animals to invasion by *F. magna*. The immediate object of the defence mechanism in the liver appears to be the encapsulation of the parasite; this is most successfully accomplished in *Bos taurus*, where the rapid production of strong fibrous tissue protects the liver from damage and so successfully encloses the parasite that it is not possible for the eggs to reach the outside world, clearly showing that this host species is not the natural one.

In *Ovis aries* an acute inflammatory reaction occurs, but the parasite does not become encapsulated and extensive damage is done to the liver, frequently resulting in death. It is possible, however, for the parasite to complete its life-history in this host, although *O. aries* appears to be too intolerant to be the natural host.

The reaction of the liver in the Cervidae is not very pronounced, there is little hindrance to the parasite's eggs reaching the exterior, and it is considered that in all probability members of this group are the natural hosts. Details of the observed histological changes are given.

VII. This paper describes the gross and microscopic appearances of the lungs of infected wild and domestic cats, dealing successively with the obvious gross changes, alterations in the lung tissue, the structure of the cysts, the bronchitis and the changes in the lymph nodes. Human autopsies of cases which have died from paragonimiasis are almost impossible to obtain in China under existing conditions, but it is probable that the pathological changes are similar to those seen in cats. [A close similarity cannot be taken for granted as there are several instances of the same parasite producing a very different response in different hosts].—E. L. Taylor.

I. Cawston, F. G. (1936). **The Attempted Cure of *Schistosomiasis* in Stock.**—*J. comp. Path.* **49.** 146-147. [3 refs.]

II. Machattie, C. (1936). **A Preliminary Note on the Life History of *Schistosoma turkestanicum* Skrjabin, 1913.**—*Trans. R. Soc. trop. Med. Hyg.* **30.** 115-124. 14 figs. on 4 plates. [10 refs.]

III. Watarai, J. (1936). **Studies on the Skin Reaction Caused by Schistosoma japonicum, cutaneously applied on the Animals.**—*Jap. J. exp. Med.* **14.** 1-18. 6 figs. on 1 plate. [16 refs.] [In English].

IV. Lane, C. (1936). **The Carriage of Schistosomes from Man to Man, with Special Attention to the Molluscs which are their Larval Hosts in Different Parts of the Earth.**—*Trop. Dis. Bull.* **33.** 1-15. [Numerous refs.]

I. C. thinks that tartar emetic can be of little practical value for the control of schistosomiasis in animals because of the necessity for repeated injections. He advocates trials with oxyquinoline derivatives of antimony and mentions " stibilase " and " trystibine " as particularly promising.

II. This parasite is definitely pathogenic for farm animals in Iraq, particularly for sheep and goats. Domestic birds and man, however, appear to be immune. The intermediate host snail is *Lymnaea tenera-euphratica* Mousson " phase " *Angustior*, which appears to suffer severely as a result of the infection. Cercariae do not occur in the water between October and May.

III. The larvae of *S. japonicum* produce a far greater local reaction in penetrating the skin of a fowl than they do in penetrating that of a rat, which is much more closely related to its proper host, and W. thinks that it is a general rule for penetrating helminth larvae to cause most trouble to animals or birds other than their proper hosts, and that the dermatitis in the schistosomiasis area of Japan is not caused by the cercariae of *S. japonicum*.

IV. This review gives a good brief account of the literature on the specific determination of man's schistosomes, and the confusion which has occurred over the differentiation between the schistosomes of man and of animals. The attempts which have been made to determine the species of the cercariae of man's schistosomes are also dealt with, and the literature on what is known of the intermediate hosts, and the spread of schistosomiasis in the various countries of the world.

—E. L. Taylor.

Cameron, T. W. M. (1936). **Studies on the Heterophid Trematode *Apophallus venustus* (Ransom, 1920) in Canada. Part I. Morphology and Taxonomy.**—*Canad. J. Res.* Sect. D. **14.** 59-69. 3 text figs., 6 figs. on 1 plate. [12 refs.]

C. re-describes *A. venustus* in detail and considers it to differ from the *A. donicus* of Europe. He records it from the dog, cat, fox, racoon, seal and heron in eastern North America, and finds it common around Montreal, where it is carried by a variety of fresh-water fish.

I. Gentile, G. (1936). Recherches expérimentales sur la " Taenia echinococcus ". [**Research on *T. echinococcus***].—*Boll. Sez. ital. Soc. int. Microbiol.* **8.** 106-111. [In French].

II. Turner, E. L., Dennis, E. W., & Kassis, I. (1936). **The Incidence of Hydatid Disease in Syria.**—*Trans. R. Soc. trop. Med. Hyg.* **30.** 225-228. 1 table. [6 refs.]

III. Urbain, A. (1936). La réaction de fixation appliquée au diagnostic de l'échinococcose de certaines espèces animales domestiques ou sauvages. [**Diagnosis of Echinococcus Infection in Domestic and Wild Animals by the Complement-Fixation Reaction**].—*C. R. Soc. Biol. Paris.* **122.** 999-1002. [5 refs.]

I. As a result of his observations on the ripe " eggs " of *T. echinococcus* in digestive juices *in vitro*, G. has come to the conclusion that the liberation of the hexacanth embryo is not a result of contact with any particular medium, but is of the nature of a biological action in which the completely ripe embryo ruptures the embryophore, and brings about its own liberation.

II. T. points out that hydatid disease is particularly prevalent in countries

where sheep rearing is a principle agricultural industry. He examined some 5,000 sheep and goats, some hundreds of cattle and a few camels at several abattoirs in Syria and found a high incidence of infestation, up to 41·4% in sheep and 45·1% in cattle. The incidence in man, as judged from hospital reports, was found to be 1 : 223.

III. U. carried out numerous complement-fixation tests over a period of some years, for the diagnosis of echinococcosis in domestic animals and animals in zoological gardens, and found the test to give an accurate result in 68·5% to 100% of cases. He considers the intradermal reaction to be valueless.—E. L. T.

Barnett, L. (1936). **Hydatid Disease in New Zealand. Prevalence, Prevention and Research.**—*N.Z. med. J.* **35.** 214-220. 4 tables. [6 refs.]

B. gives tables to show the incidence of hydatids in human beings in New Zealand. He states that, in 1935, one patient in every 823 in hospitals was affected with hydatids, a total of 106 hydatid cases being observed. He also states that infection was higher in the South Island than the North Island, the South having a higher sheep population and presumably a higher dog population.—C. S. M. H.

Tokayer, J. (1936). Adatok az echinococcus magyarországi elterjedéséhez. [**Echinococcus in Hungary**].—*Állatorv. Közl.* **33.** 109-110.

T. found *Echinococcus granulosus* in only 4 (3·27%) out of 122 dogs examined. He examined the carcasses of 1,072 sheep, and found echinococcus cysts in 138 (12·87%); in about 170 of 1,176 cattle (14·45%); and in 231 of 1,424 pigs (16·22%).

Parnell, I. W. (1936). **Studies on the Bionomics and Control of the Bursate Nematodes of Horses and Sheep. II. Technique.**—*Canad. J. Res.* Sect. D. **14.** 71-81. 4 tables. [17 refs.] [See also *V. B.* **5.** 1].

P. describes the technique which he has evolved for comparing the effects of different substances on the larvae of bursate nematodes in horse manure. The manure, in contact with varying quantities of the chemical under test, is cultured in cheese-cloth bags in a dark, constant temperature room at 25°C. After culture, the larvae are extracted by a Baermann technique and are counted. The number collected, compared with the number in control bags, gives an index of the efficiency of the chemical tested. The significance of the results and the possible fallacies are discussed in detail. The results of the tests will appear in future papers.—T. W. M. Cameron.

I. Stoll, N. R. (1936). **Observations on Cattle Nematode Infections, with a Demonstration of their Secondary Transmission to Grazing Sheep.**—*J. Parasit.* **22.** 386-407. 2 tables. [Numerous refs.]

II. Marsh, H. (1936). **Observations Based on Weekly Parasite Egg Counts on Feces of Lambs and Yearling Sheep.**—*Ibid.* 379-385. 2 charts. [1 ref.]

III. Davey, D. G. (1936). **On the Incidence of the Abomasal Parasites in the Lambs of South-West Britain.**—*J. Helminth.* **14.** 85-92. 1 table. [12 refs.]

IV. Fraser, A. H. H., Robertson, D., & Ritchie, J. E. (1936). **The Effect of Salting Pasture on the Incidence of Stomach Worms in Sheep.**—*Ibid.* 101-106. 1 table. [2 refs.]

V. Fraser, A. H. H., Robertson, D., & Ritchie, J. E. (1936). **The Correlation between the Worm-Burden and Live-Weight Increase of Grazing Sheep.**—*Ibid.* 99-100. 1 table. [1 ref.]

I. Cattle were placed in a presumably worm-free pasture in 1931 and species

of the eight genera, *Haemonchus*, *Trichostrongylus*, *Cooperia*, *Nematodirus*, *Capillaria*, *Trichuris*, *Gongylonema* and *Setaria* were subsequently found to be present, having been introduced by the cattle. Worm-free lambs were placed in the same pastures in 1933, and were found to become infected with *H. contortus*, *T. axei*, *C. curticei*, *C. longipes*, *N. helvetianus*, *T. ovis*, and *G. scutatum* showing that these species are transmissible from cattle to sheep, and suggesting that biological strains are not concerned. Data are also given on the extent of increase of infestation in the animals as a result of the increase of animal population in the pastures under observation.

II. This paper deals with two series of weekly egg counts, on the faeces of a group of 12 lambs and a group of 4 yearling sheep at pasture. The output of *Ostertagia* eggs was found to reach a peak in August for the lambs, and in September for the yearlings, the numbers decreasing rapidly after the maximum had been reached. *Ostertagia* eggs were first seen in the lambs' faeces at the age of 22 days, *Nematodirus* eggs at 27 days, but *Moniezia* eggs only at 141 days old.

III. Six hundred healthy lambs were examined at the abattoir for trichostrongyloid worms, the parasites in 100 of them having been counted. *Ostertagia circumcincta* was found in all but two of the 100 lambs, *Haemonchus contortus* only in 32 of the 100 and *Trichostrongylus extenuatus* in only 15, although it is thought that the method of examination which was followed might have allowed some of this minute species to escape observation.

IV. Sixteen worm-free lambs were placed on pasture treated with salt, one dressing at the rate of one ton to the acre, and one at the rate of half a ton to the acre, and 17 worm-free lambs were placed on similar pasture which was not so treated. At subsequent *post-mortem* examination the lambs on the treated pasture were found to carry an average of 17 *H. contortus*, 257 *Ostertagia* spp. and 223 *T. axei*, and those on untreated pasture to carry an average of 42 *H. contortus*, 271 *Ostertagia* spp. and 175 *T. axei*. The authors conclude that " infestation with *Haemonchus contortus* had significantly decreased, but that infestation with *Ostertagia* spp. and *Trichostrongylus axei* was not significantly affected."

V. The table gives the total number of worms found in the abomasum, and the increase in weight of each of the 31 sheep used in the experiment mentioned in the previous paper. Statistical analysis of the figures is said to show a correlation between gain in weight and number of parasites. [This correlation is not otherwise apparent].—E. L. Taylor.

Ejsmont, L. (1935). Zależność pomiędzy lokalizacją Dioctophyme renale a drogami rozwojowemi w żywicielu. [**Localization of** *D. renale*].—*Pam. XIV Zjazd Lek. Przyrod. Polsk. Poznane. 1933.* pp. 861-865. [Reprinted in French in *Rocz. Prac. Nauk. Zrzesz. Asyst. Uniw. Warszawa. 1936.* **1.** 473-485].

The route by which *D. renale* invades its host is still unknown. E. inclines to the view that the young forms make their way to the urinary system *via* the liver. The proximity of the right kidney to the liver is held to explain why this worm is found more frequently in that organ.—A. Szwabowicz (Lwów).

IMMUNITY.

Jørgensen, M. (1936). Nogle undersøgelser vedrørende forhold, som kan influere paa reaktionstallets størrelse ved den intrakutane tuberkulinprøve, navnlig med henblik paa omprøven med fjerkraetuberkulin. [**Factors**

influencing the Accuracy of the Intradermal Tuberculin Test].—*Maanedsskr. Dyrlaeg.* **48.** 285-298 and 310-319. 1 fig., 7 tables.

The intensity of reaction in the intradermal test as used in Denmark was observed under various conditions. When tests were made on 85 animals of reactions in the skin in front of and behind the shoulder, the figures for reaction were on an average 0·22 mm. higher for the tests behind the shoulder than for those in front of the shoulder. When tuberculin was deposited in the deeper layers of the skin a stronger reaction developed than when it was deposited more superficially (the average difference in 55 animals was 0·94 mm.). The injection of different amounts of tuberculin (0·05, 0·1 and 0·2 c.c.) showed that the largest dose caused the strongest reactions, but the small dose always gave an unmistakable reaction. When making comparative simultaneous tests with bovine and avian tuberculin, it is, of course, important to inject equal amounts of each. When retesting animals simultaneously with bovine and avian tuberculin, it is of importance that, besides the two figures from the simultaneous test, the figure from the preceding test with bovine tuberculin should be taken into consideration.
—H. C. Bendixen (Copenhagen).

Platt, A. E. (1936). **The Relationship of the Complement Fixation Optimum to the Agglutination Optimum.**—*Aust. J. exp. Biol. med. Sci.* **14.** 101-106. 3 figs. [6 refs.]

Using a strain of pneumococcus, P. first determined the concentration of bacterial suspension which gave optimum agglutination with a given antiserum dilution. Then varying concentrations of organisms were put up against varying dilutions of antiserum in a complement-fixation test. In the lower serum dilutions, maximum fixation occurred in mixtures containing antibody in excess of that in which optimum agglutination took place, but with higher serum dilutions the complement-fixation optimum occurred with antigen excess. When *Brucella abortus* was used instead of pneumococcus, these phenomena were demonstrated even more clearly.

In a further experiment, a suspension of pneumococcus was allowed to react for varying periods with similar proportions of antiserum. A complement-fixation test was then carried out with these mixtures. In the tubes in which antigen and antibody had been in contact for an hour or more and in which there was visible partial flocculation before the complement was added, there was only partial fixation of complement, whereas this was complete in the tubes in which the antibody and antigen had not been mixed so long. Optimum complement-fixation appears to be related to the size of the particles of antibody. A large number of organisms partially sensitized may fix more complement than a smaller number optimally sensitized for flocculation.—W. I. B. Beveridge.

Meyer, K. F. (1936). **Latent Infections.**—*J. Bact.* **31.** 109-135.

M. refers to the frequent use now made in medical literature to the terms " symptomless infection " and " infection inapparente ", the latter being applied by Nicolle to a certain condition in g. pigs associated with the injection of typhus blood. He asks whether the introduction of such terms is justified and if their meaning has not already been provided for in the term " latent infection ".

He cites cases in which the injection of an antigenic substance results in the development of immunity without any manifestation of disease. This type of infection deviates markedly from what is generally recognized as the normal, and appears to justify the use of a special name. In the cases in question the criterion is considered to be the rise and fall of the virus growth curve.

If, however, the term " symptomless infection " is used, it should be applied only to cases in which the virus is distributed, with respect to time, location and quantity, in a manner characteristic of the usual course, without causing the appearance of clinical or anatomical signs of disease. By " latent infection," on the other hand, should be understood a subacute or chronic state of disease, existing without evident symptoms, in which the carrier harbours the disease agent.

NICOLLE's list of diseases in which symptomless infection may occur is given, and M. suggests various additions to it such as rinderpest, swine fever, etc. He then proceeds to examine in turn certain recognized conditions, their nature and the type of reaction they represent. " Rudimentary " or " abortive " infections are atypical forms of disease. " Latent microbismus ", as seen in delayed tetanus and gas gangrene infections, is essentially different from symptomless infection, as are also diseases exhibiting long incubation periods such as rabies and psittacosis. Saprophytism and symbiosis are then dealt with, and *T. lewisi* infection of the rat, anaplasmosis of cattle and brucella infection of goats are given as examples of the latter condition. These are not to be confused with symptomless infection, since lesions are produced.—C. DAVENPORT.

I. SCHAMBOUROFF, D. A., & BELIKOWA, O. P. (1936). Role du système nerveux dans l'immunité, irritation conditionnelle, inhibition conditionnelle et leucocytose. [**The Part Played by the Nervous System in Immunity. Conditional Irritation, Conditional Inhibition and Leucocytosis**].—*Ann. Inst. Pasteur.* **56.** 700-709. 9 tables.

II. WEINBERG, M., & GUELIN, A. (1936). Recherches sur l'immunité active de l'embryon. [**Active Immunity of the Embryo**].—*C. R. Soc. Biol. Paris.* **122.** 1229-1231.

I. S. and B. refer to the work of METALNIKOFF on the response of the body to external irritation and the association of the nervous system in the phenomena of immunity production. They carried out two sets of experiments in a similar connexion. In the first series, rabbits were subjected to direct stimulation of the nervous system by bell-ringing (conditional irritation), followed immediately afterwards by the injection of a bacterial antigen. This procedure was repeated for 20 days. The animals so prepared were then subjected to bell-ringing alone for a further ten days. In the second series, rabbits similarly prepared were employed but subjected to an alternative form of irritation, namely, the inhalation of noxious drugs (conditional inhibition).

As an indication of the immunological reaction of the rabbits to these procedures, leucocyte counts were made at hourly intervals following the application of the various stimuli. The leucocytosis which was shown under conditional irritation was lost when the other form of stimulus was substituted.

II. RAMON and others have shown that an active immunity conferred on the parent is not necessarily shared by the foetus, the placenta apparently barring the passage of the antigenic agent. W. and G. studied the effect of direct injection of antigen into the embryo. The embryonic chicken was chosen as the subject for test and *Clostridium sporogenes* as the antigenic agent. No agglutinins were elaborated by the embryo throughout the whole period of its incubation.—C. D.

I. HOLT, L. B. (1936). **The Purification of Staphylococcus Toxoid.**—*Brit. J. exp. Path.* **17.** 318-323. 3 tables. [5 refs.]

II. HOLM, A., ANDERSON, J. F., & LEONARD, G. F. (1936). **Combined Staphylococcal Endo- and Exo-Antigen.**—*Proc. Soc. exp. Biol., N.Y.* **34.** 502-504. [3 refs.]

III. Ramon, G., Richou, R., & Djourichitch, M. (1936). Sur le mécanisme de l'immunité conférée par l'anatoxine staphylococcique à l'égard de l'infection par le staphylocoque virulent. Démonstration expérimentale. [**Mechanism of Immunity Conferred by Staphylococcus Anatoxin**].—*Rev. Immunol.* **2.** 482-493. 3 tables. [Numerous refs.]

IV. Morgan, F. G., & Craydon, J. J. (1936). **Toxins of the Staphylococcus, with Special Reference to the Estimation of Potency.**—*J. Path. Bact.* **43.** 385-401. 6 tables, 1 chart. [4 refs.]

I. Toxin prepared by growing staphylococci on a dialysate medium is toxoided with 0·3% formalin and the toxoid is purified by saturation with ammonium sulphate, filtering off the precipitate, and dialysing it for two days. Such toxoid is free from all the nitrogenous constituents of the original medium and is not inferior antigenically to those prepared on the routine medium and not purified with ammonium sulphate.

II. A method of preparing multivalent staphylococcus toxoid is described in which lysis by bacteriophage is utilized in order to produce endotoxic as well as exotoxic principles. The authors claim that it is a more effective antigen for active immunization than the ordinary formol-toxoid.

III. The immunity conferred by staphylococcus anatoxin appears to be mainly antitoxic, a specific antitoxin being produced. Other factors such as phagocytosis, etc., appear to be of little importance.

IV. By means of two type sera, toxic filtrates from single strains of staphylococci have been classified into two groups. Two components of α type with distinct combining properties were demonstrated ($\alpha 1$ and $\alpha 2$) both of which were different from the β type of Glenny and Stevens. Both appeared to be antigenic and both were haemolytic for rabbit red cells and dermonecrotic for the skin of g. pigs. Owing to the small proportion of $\alpha 2$ toxin in toxic filtrates, demonstration of its lethal effect for rabbits was not practicable.—A. Robertson.

I. Boivin, A., & Mesrobeanu, Lydia. (1936). Variations bactériennes et antigène somatique O complet. [**Bacterial Variations and Complete Somatic O Antigen**].—*C. R. Acad. Sci., Paris.* **203.** 1402-1404. [3 refs.]

II. Horgan, E. S. (1936). **Notes on the Vi Antigen of** *Bacillus typhosus*.—*J. Hyg., Camb.* **36.** 368-380. 5 tables. [11 refs.]

III. Ørskov, J., & Kauffmann, F. (1936). **Studies on the Significance of "Vi Antigen" in the Mechanism of Typhoid Infection in Mice.**—*Ibid.* 514-524. 6 tables. [10 refs.]

IV. Rochwell, G. E., & van Kirk, H. C. (1936). **The Production of Heterophile Antigen by Certain Bacteria and Plants.**—*J. infect. Dis.* **59.** 171-173. 2 tables. [5 refs.]

I. This note describes the relation of the "antigène somatique O complet" of the authors to the well-known diphasic phenomenon in *S. typhi-murium* and the equally well-known smooth-rough variation. They found that their antigen was always present in the smooth strains and that it was always absent from rough strains. The presence of their antigen bore no relation to the presence or absence of the "H" antigen.

II. H. has found that heart extract in the medium has an inhibitory effect on "Vi" agglutination. In producing an anti-"Vi" serum four doses (subcut.) of virulent culture are given before four doses (intraven.), the dose being increased from 200 million to 400 million organisms. Formolized vaccines for this purpose were a failure. Suspensions heat-killed at 55°C. for one hour were used for "Vi" agglutination.

The occurrence of " Vi " antigen in recently isolated strains is discussed. The use of " Vi " agglutination in diagnosis and prognosis is considered to be limited.

III. The authors confirm the findings of FELIX. Large doses of living V forms of typhoid bacilli may cause death from intoxication within two days. Surviving mice, though clinically healthy, harbour the organism in the blood and other organs. Smaller non-intoxicating doses show no difference between V and W forms, and the conclusion is drawn that the " Vi " antigen plays no part in the virulence of the typhoid bacillus in the mouse.

Only the V form could be used for active immunization and only sera containing " Vi " antibody can protect prophylactically. The therapeutic effect of such sera is nil. [V = " O " inagglutinable, " Vi " antigen present : W = " O " agglutinable, " Vi " antigen absent].

IV. The presence of heterophile antigen was sought in different bacteria and in various vegetables. Such antigen was found in Friedländer's bacillus, to some degree in meningococci and *Haemophilus pertussis*, and in freshly isolated Pfeiffer's bacilli. The antigen was not found in strains of *Brucella abortus*, the gonococcus and *Corynebact. acnei.*

It is suggested that this antigen is capsular in origin as well as somatic. Spinach, beets and turnips contained some heterophile antigen.—D. L. HUGHES.

McCLEAN, D. (1936). **A Factor in Culture Filtrates of Certain Pathogenic Bacteria which increases the Permeability of the Tissues.**—*J. Path. Bact.* **42.** 477-512. 14 tables. [Numerous refs.]

McC. has found in culture filtrates of *Clostridium welchii* Type A a factor which increases the permeability of the tissues. This substance had been noticed previously in filtrates of staphylococci and streptococci by DURAN-REYNALS and is similar to the diffusing factor in testicular extracts studied by him. He has found it in less degree in *Cl. welchii* Type C (*paludis*), *Cl. welchii* Type D (*ovitoxicum*), *Cl. chauvoei*, *Cl. septique*, *Corynebact. diphtheriae* and *Pneumococcus*. In the case of the anaerobic organisms there was no correlation with toxigenicity ; in the case of *C. diphtheriae* there was no significant difference between the *gravis* and *mitis* types. With pneumococci it was found in filtrates of virulent strains, but not in non-virulent non-capsulated strains. The factor was not found in *Cl. oedematiens*, *Cl. tetani*, *Cl. histolyticum*, *Pasteurella pestis*, *Corynebact. pseudotuberculosis*, *Salmonella typhi* nor in *B. anthracis*. The method of detecting and of measuring the amount of the factor is described. It was found to remain stable even after several weeks of storage at 0°C. and at room temperature. It deteriorated if kept at 37°C. but was not affected by formaldehyde (0·4%). It has been shown to be antigenic and distinct from toxin. A method for its purification and concentration is described. McC. discusses its significance in inflammation and in bacterial invasion and suggests that, though the elaboration of the factor does not determine the power to invade, it is a powerful accessory in promoting local penetration of the tissue and dissemination of the infection throughout the body. —C. McG.

DISEASES, GENERAL.

MIESSNER, H., & HARMS, F. (1936). 8. Tagung der Fachtierärzte für die Bekämpfung der Aufzuchtkrankheiten. Sammelbericht der Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten. Berlin 16. bis 18. September 1936. **[8th Meeting of the Veterinary Specialists for the Campaign against Diseases**

of Breeding Animals and New-Born Livestock at Berlin, September, 1936. (Report of the Reich Centre)].—*Dtsch. tierärztl. Wschr.* **44.** 639-653 and 657-663. 12 tables.

The report period has been extended to three years instead of two as previously [*V. B.* **5.** 172.] and this report extends from April, 1933 to March, 1936. Twenty-eight institutes contributed the material for review. This report is rich in details of local conditions.

DISEASES OF HORSES.

STERILITY.—Horse-breeding increased greatly and with it the common associated diseases, so that over 27,000 mares were examined for sterility, a 12-fold increase over the previous report period. In most parts of Germany there is a uniform examination and treatment system for mares with any unsatisfactory breeding history. The most common cause of sterility was uterine catarrh: numerous types of treatment were used.

ABORTION.—904 foetuses were examined: *Salmonella abortus-equi* was present in 11·3%, *Bact. coli* in 11·8%, *Streptococcus pyogenes* in 8·4%, *Bact. equirulis* in 3·7%, diplococci in 2·5% and micrococci in 0·4%. No bacterial infection was found in 558 cases, and nearly all of 719 samples of uterine secretion were negative for bacteria. Contagious abortion has remained stationary, and was still most prevalent in East Prussia, where it is under a strict system of hygienic control (details given). Hormonal diagnosis of pregnancy was widely used.

DISEASES OF FOALS.—1,450 samples of material were examined: *Bact. coli* was found in 22·6%, *Bact. equirulis* in 21·3%, streptococci in 15·5%, diplococci in 3·4%, *S. abortus-equi* in 1·6% and a few others each in less than 1%. [Great detail is given in this section].

DISEASES OF CATTLE.

STERILITY.—Over 397,000 animals were examined by 13 institutes during a national campaign, in the course of which the cooperating herds were examined one to three times a year. In Thuringia the campaign was on an obligatory basis. Statistical figures on the causes of sterility were given by six institutes, the results varying remarkably [variability of the personal factor in diagnosis ?].

ABORTION.—More than half a million examinations were made for brucellosis, and it was confirmed in 41·5% of 6,206 foetuses and in 14·6% of 464,329 blood samples, as well as in other organs and secretions. The individual reports should be read for further details. [Live ?] vaccines were used by some workers. Favourable reports were received on the complement-fixation and clearing (Meinecke) reactions, and also on the Petragnani-Witte malachite green medium for differentiating brucella strains.

Trichomonad infection spread further. It has but recently appeared in Pomerania.

DISEASES OF CALVES.—The results of bacterial diagnostic work on 6,990 calves are given under 23 headings. *Bact. coli* was found in 42·7% and no bacteria in 16%.

DISEASES OF SWINE.

STERILITY.—Aspermia was found in a few boars.

ABORTION.—320 foetuses were examined: 67% were bacteriologically negative, 15% showed *Bact. coli* and 10% *Brucella abortus*.

PIGLET DISEASES.—8,924 carcasses etc., were examined: the results are given in a table. The six most important causes of death were gastro-enteritis, *Bact. coli* infection, malnutrition, enzootic pneumonia, pasteurella infection and heart-muscle degeneration. Swine fever decreased and piglet influenza increased in

importance. Enzootic hepatitis, piglet anaemia and "Schnüffelkrankheit" (ostitis fibrosa) are also described.

Diseases of Sheep.

Abortion.—288 foetuses were examined; 19·8% were infected with *S. abortus-ovis* and 60·4% were negative on bacteriological examination.

Diseases of Lambs.—The findings on 1,761 lambs are given under 22 headings. About 39% were bacterial infections, headed by haemorrhagic septicaemia. Mastitis of ewes, also bradsot, gave some trouble. Reports are also given on sheep pox, tetanus and Borna disease in sheep, and a "peculiar disease of lambs in which they have tetanic attacks".

Diseases of Goats.

A few notes on various diseases are given.

Diseases of Fur Animals.

Diseases increased with intensified breeding.

Foxes.—It is stated that 25% of breeding vixens are sterile, largely as a result of malnutrition. Abortions sometimes occur. Diseases are given under 19 headings: 298 carcasses were examined. The six most frequent causes of death were encephalitis, lungworm infestation, *S. enteritidis* infection, tuberculosis, ascariasis and malnutrition.

Mink.—77 dead mink were examined. The causes of death were mostly gastro-enteritis and bad care and feeding. Distemper caused some deaths.

Nutria.—33 dead nutria were examined; 16 had bacterial infection and 17 had organic disease.

Musk-rats.—11 were examined: the causes of death included anthrax, tuberculosis and ascariasis.

Diseases of Poultry.

Domestic Birds.—11% of 156,211 blood samples and 28% of 7,131 birds gave positive reactions for *S. pullorum*, which was also found in one goose and two ducks. Fowl paralysis was diagnosed in 164 chickens: its nature is discussed. Fowl leucaemia showed an increased incidence. Many short notes are also given on other diseases of fowls, geese, ducks, turkeys, pheasants and pigeons.—J. E.

Flückiger, G. (1936). Die Bekämpfung der chronischen Seuchen. [**Control of Chronic Infections (Tuberculosis, Mastitis and Bovine Brucellosis)**].—*Schweiz. Arch. Tierheilk.* **78.** 457-470. [8 refs.]

A lecture in general terms on the development of natural and international control of chronic infectious diseases of animals, with special reference to bovine tuberculosis, brucellosis and mastitis. The progress of control in Switzerland is discussed [*V. B.* **6.** 753]. By October, 1936, the state control scheme for brucellosis and mastitis had been adopted by 15 cantons and that for tuberculosis by 8 cantons.—J. E.

Wirth, D. (1936). Sammelreferat Veterinärmedizin 1934. [**Veterinary Haematological Review for 1934**].—*Folia haemat., Lpz.* **55.** 266-282. [Num. refs.]

Important items from the original, which is already condensed, are as follows:—

Technique.—New methods of obtaining heart blood from fowls and blood from the ear of rabbits are recorded. Hb estimation was studied by Filmer and by Kernkamp. R.B.C. sedimentation in the horse and the sublimate test in various animals were studied.

Normal Blood.—Numerous papers were published on the blood content and the blood picture (B.P.) of domestic animals.

Anaemias.—Wirth found that the process of blood regeneration after anaemia is different in the horse, dog and man. Hecke, Král, Lamarre, Mocsy and Richters all wrote comprehensive articles on equine infectious anaemia and many workers contributed to its various aspects. Hamilton *et al.* worked on piglet anaemia. Reference is made to goat-milk anaemia.

Haemorrhagic Diatheses.—Marcenac found 25% to 30% sodium citrate (intraven.) a good styptic for nasal bleeding in horses. Various kinds of purpura in animals were reported. Kuessel recorded haemosiderosis in various canine diseases.

Leucaemias.—Jarmai reviewed the leucaemias of domestic animals. Leucaemia and neoplasia are closely allied in nature. Dobberstein *et al.* advanced the knowledge of bovine lymphadenosis and much work was carried out on fowl leucaemia.

Various Diseases.—The B.P. in numerous animal diseases was studied and many articles published.

Drugs and Poisons.—The B.P. was studied in lead poisoning in ducks, oxalic acid and benzol poisoning in rabbits, and in injury from poison gas. A report was drawn up on the effect on the B.P. of " ergotropin ", " perlacar ", " lentin ", acridin, " Hoeckst 3043 ", " balkanol ", thorium dioxide and turpentine, and of ultra-violet rays, X-rays and short waves.

Blood Groups.—Reference is made to the work of Schermer and of other authors.—J. E.

Wirth, D. (1936). Sammelreferat Veterinärmedizin 1935. [**Veterinary Haematological Review for 1935**].—*Folia haemat., Lpz.* **55.** 423-436. [Num. refs.]

Reference is only made here to more important papers reviewed.

Technique.—Zavrnik *et al.* emphasized the need for standardization of methods and for the tabulation of data in blood picture (B.P.) work. Kernkamp *et al.* worked out a comparison formula for various methods of estimating Hb in porcine blood.

Normal Blood.—Papers were published on the normal B.P. of horses, cattle, piglets, dogs, cats and fowls. Thoroughbred horses show a higher R.B.C. count and Hb figure than coarse breeds. The B.P. of bitches in oestrum and of fowls was also studied.

Various Tests.—Papers on the following were published :– blood viscosity in fowls ; blood albumin of ruminants, urobilin in dog blood, bilirubin in horses, sheep, swine, dogs, fowls and laboratory animals ; R.B.C. sedimentation in horses ; sublimate test in horses ; the guttadiaphot test in dogs, and blood coagulation in dogs.

Anaemias.—The current literature on equine infectious anaemia, piglet anaemia and hookworm anaemia is discussed.

Mammalian Leucaemia.—Leucaemia in cattle, which is commonly lymphadenoid in character, was studied by Dobberstein *et al.*

Avian Leucaemia was investigated by many independent workers but no agreement was obtained upon its true nature.

Haemorrhagic Diatheses.—Reports are given on a purpura in dogs, haemophilia in cows, Stuttgart disease and a review of French papers on the haemoglobinaemias.

Spleen.—Reference is made to the effect of splenectomy on protozoan diseases.

Various Diseases.—Papers were published on the B.P. in swine fever, rinderpest, strangles, rabies, canine distemper, " angina " (? pharyngitis) in dogs and

horses, fowl spirochaetosis, dourine, leishmaniasis in sheep and dogs, rickettsiasis in dogs, cutaneous habronemiasis, filariasis and various organic diseases.

Drugs and Poisons.—The B.P. was studied in lead poisoning in animals, and also in animals dosed with vaccines and non-specific remedies.

Blood Groups.—Schermer reviewed the knowledge on blood groups in horses, cattle, sheep and swine, and other workers carried out further studies in relation to various animals.

Transfusion.—The principles of transfusion in veterinary work with reference to the blood groups were investigated by several workers and tests for compatibility were worked out.—J. E.

Fischer, C. (1936). Bösartiges Katarrhalfieber bei Rindern. [**Malignant Bovine Catarrh**].—*Dtsch. tierärztl. Wschr.* **44.** 470.

F. describes the farming conditions under which malignant catarrh occurs in his practice. It affects cattle in soft condition, kept in badly ventilated and damp stalls to which sheep have access. F. considers that these three factors are significant in the incidence of the disease.—J. E.

I. Bruder. (1936). Ueberblick über Futtermittel, Fütterung, Rationssätze und deren Beziehungen zu den Magendarmerkrankungen der Pferde in den neuzeitlichen Heeren. Hinweise und Vorschläge zu der Fütterung des Truppenpferdes. [**The Influence of Dietetics on Gastro-Intestinal Disease of Army Horses**].—*Z. Veterinärk.* **48.** 305-318. 2 tables. [9 refs.]

II. Gratzl, E. (1936). Beiträge zum Kolikproblem. III. Mitteilung. [**The Problem of Colic. III**].—*Wien. tierärztl. Mschr.* **23.** 417-428 and 449-455. 1 fig.

I. B. investigated the methods of feeding horses in the armies of the large European nations and of the U.S.A. and compared the relative incidence of colic with the dietetics. He considers the main cause of colic to be the use of chopped hay and straw, when the length of the pieces is less than 2 cm., so that the ration is easily swallowed without the necessity for much chewing. Longer pieces necessitate chewing and good salivation. He also questions the policy of watering before feeding and points out that, in stables with a laid-on water supply, horses drink lightly at frequent intervals, including the meal time. Lucerne hay and clover hay are recommended as partial substitutes for hay and straw. B. concludes by giving instructions for feeding and managing army horses at different times of the year and on various types of work.

II. G. discusses the various forms of equine colic, and their frequency, nature and causation. He also implicates poor quality fodder and too short " chop " as the common cause. The subject is divided into sections on " catarrhal intestinal cramp " [simple spasmodic colic], intestinal obstipation [obstructive colic], gastric dilatation and impaction, intestinal tympany and intestinal dislocation, including twist, invagination and incarceration.

In general G. considers that abnormal action of the muscular coat of the viscera is the chief cause of most of these conditions.—J. E.

Schnabel, H. (1936). Entozootická obrna míchy u koní na Podkarpatské Rusi. [**Enzootic Myelitis of Horses in Ruthenia**].—*Zvěrolék. Obz.* **29.** 185-187.

S. describes three cases of equine myelitis which occurred simultaneously in one farm in Ruthenia. The disease occurs sporadically in some districts. It manifests itself clinically by progressive paraplegia. *Post mortem* there was parenchymatous degeneration of the liver. An examination of the central nervous

system gave negative results. The disease is probably identical with that designated in literature as " paraplegia enzootica equorum ". It can be differentiated from Borna disease by the negative findings in the central nervous system and by the absence of motor disturbances in the brain. [An account of " equine infectious paraplegia " was given by BENDIXEN – *V. B.* **6.** 608].—E. PŘIBYL (BRNO).

I. STUBBS, E. L. (1936). **Fowl Paralysis and its Relation to Leukemia in Chickens.**—*Vet. Ext. Quart. Univ. Pa.* **36.** No. 61. 16-21. 2 tables.

II. EMMEL, M. W. (1936). **Hemocytoblastosis and its Relation to the Development of Fowl Paralysis and Fowl Leukemia.**—*J. Amer. vet. med. Ass.* **88.** 45-50. 1 fig. [7 refs.]

III. FURTH, J. (1935). **Lymphomatosis in Relation to Fowl Paralysis.**—*Arch. Path.* **20.** 379-428. 50 figs. on 13 plates, 15 tables. [Numerous refs.]

I. This is an account of transmission experiments on chickens with blood from two birds suffering from spontaneous paralysis.

The result is given in two tables and S. concludes that this work indicates the possibility of transferring fowl paralysis by means of blood and nerve injections, that the causative agent is probably present in the blood and the nerves involved, and that the results obtained warrant further efforts to study the cause of fowl paralysis, its transmission and relationship to leucaemia.

II. E. states that haemocytoblastosis can be induced in chickens by the oral and intravenous administration of micro-organisms of the paratyphoid group and by the intraperitoneal injection of tissue-emulsions and filtrates of the organs of affected birds.

Haemocytoblastosis induced by these means may lack the impetus necessary to the development of fowl paralysis or leucaemia, but the investigations indicated that when enteritis is present these conditions follow, enteritis being the predisposing factor.

Young birds affected with haemocytoblastosis showed lack of growth, and laying birds a decreased egg yield.

The necessity for using birds free from haemocytoblastosis in experiments upon fowl paralysis, leucaemia and allied conditions is apparent.

III. A description of experiments in connexion with lymphomatosis in chickens. The report is divided into five parts and contains a number of well-produced photo-micrographs.

Two varieties of transmissible lymphomatosis are described. One (strain 2) produces lymphomatous tumours after intramuscular transmission; there is infiltration of blood-forming organs, the presence of large lymphocytes is characteristic, and the disease is almost invariably associated with lymphatic leucaemia. As a rule it produces severe anaemia, often infiltrates nerves, but seldom produces clinical paralysis. It is very rare as a spontaneous disease, and is readily transmissible by cell-free material.

The second type (strains 5 and 6) produces mainly lymphomatosis of the nerves, often associated with lymphomatosis of the viscera, seldom with lymphatic leucaemia and never with anaemia. It is characterized by a predominance of small lymphocytes, and is frequent as a spontaneous disease, but its transmissibility by cell-free material has not hitherto been proved.

Sub-passages of neurolymphomatosis are best made by intraneural inoculation. Twelve unsuccessful attempts were made with strain 5 before the disease was transmitted. Strain 6 is stated to be of somewhat obscure origin.

The blood of paralysed chickens contains the transmissible agent in high concentration during the entire course of the illness, and when introduced by the

intravenous route it produces neurolymphomatosis, indistinguishable from the spontaneous disease. Blood cells readily transmit the disease, but plasma does not. The transmissibility of the disease by a virus, though probable, is not proved.

After intraneural injection of tissues from paralysed birds the inoculated nerve becomes greatly thickened and general neurolymphomatosis follows. The disease spreads along the course of the nerve fibres but the cord is seldom infiltrated, and distant lesions are probably the result of haematogenous spread.

Lymphomatous infiltration and tumours of the viscera may be caused by the same virus that produces neurolymphomatosis. Neurolymphomatosis is usually unassociated with morphological blood changes, but in rare instances it is associated with lymphoid leucaemia.

Neurolymphomatosis is a neoplastic disease, allied to leucosis and sarcoma, but it is not produced by the agent that causes erythroleucosis and myeloid leucosis; nor does the agent of neurolymphomatosis produce erythroleucosis or myeloid leucosis.—K. D. Downham.

I. Dimock, W. W., Healy, D. J., & Hull, F. E. (1934). **Acidosis of Pregnant Ewes: So-Called Pregnancy Disease of Sheep.**—*Bull. Ky agric. Exp. Sta.* No. 354. pp. 243-268. 3 figs., 17 tables. [Numerous refs.]

II. Hull, F. E., & Dimock, W. W. (1935). **Pregnancy Disease of Sheep.**—*Ext. Circ. Ky Coll. Agric.* No. 274. pp. 6.

I. The symptoms of acidosis in pregnant ewes (corresponding to pregnancy toxaemia in Great Britain) are described. There was no evidence of any bacterial infection in any of 106 dead ewes. On *post-mortem* examination, the general findings were fatty degeneration of the liver and sometimes of the kidneys also. The urine of ewes affected by acidosis is generally acid, contains albumin and acetone (often detected in the breath) and also contains from 8 to 15 times the normal quantity of ammonia. A diminution of blood calcium and an increased phosphorus content are observed, the Ca:P ratio being less than normal. The alkali reserve of the blood is also greatly diminished. The condition results from the poor management and inferior feeding of the ewes, coupled with the natural drain upon the Ca reserves of the mother during the last two months of pregnancy. No known treatment is effective in advanced cases, but the condition is preventable by the proper nourishment and care of the ewes during pregnancy. Acidosis was induced in experimental ewes by improper attention and feeding.

II. A popular bulletin issued for the benefit of farmers, embodying the above findings. Inadequate shelter, lack of green food and of free access to water are given as factors in poor animal husbandry which contribute to the incidence of the disease.—Alfred Eden.

I. Anon. (1936). **The Relationship of the Iodine Contents of Water, Milk and Pasture to the Occurrence of Endemic Goitre in Two Districts of England.**—*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 217. pp. 20 + xii. 5 tables. London: H.M. Stat. Off. [8vo] [6d.]

II. Wright, E. J. (1936). **Polyavitaminosis and Asulphurosis.**—*Brit. med. J.* Oct. 10th. 707-712. 2 tables. [Numerous refs.]

I. A report is given of a survey of the incidence of thyroid enlargement among female school children from 6 to 14 years of age, conducted in the counties of Somerset and Suffolk, which, in accordance with previous work, showed a high incidence in the former and a low one in the latter county. Samples of water and milk consumed by the school children in 12 selected villages in each county were analysed for iodine, and a further study made of the iodine contents of pastures on which the milch cows were grazed.

The analyses showed a marked and consistent deficiency in the iodine content of the Somerset waters as compared with those of Suffolk ; the milk and pasture samples from the two counties showed no significant differences.

It is concluded that the results demonstrate again the recognized relationship of environmental deficiency of iodine to the incidence of goitre, but they do not give conclusive proof that such deficiency is the sole cause of the thyroid abnormality in the district investigated. The possible role of variation in the availability of soil iodine to herbage, and hence to animal population as a complicating factor is briefly discussed.

II. A discussion is given of the synergism of vitamins A and B, the clinical characteristics, localization of early lesions, and some therapeutic experiments in cases of A and B avitaminosis disease.

Observations are reported showing that (1) an excess of cereal not containing a cyanogen group, added to a balanced diet, can precipitate the A and B avitaminosis disease ; (2) vitamins A and B can remain inactive in the organism if its sulphur content falls below a certain level, and (3) great benefit to the patients and economy in treatment result from judicious sulphur therapy.

It is concluded that vitamins A and B are interdependent for their efficient functioning.—R. Allcroft.

Muir, W. R. (1936). **The Teart Pastures of Somerset.**—*Agr. Progr.* **13.** 53-61. [9 refs.]

Teart pastures occur in certain parts of Somerset and on them, animals, particularly dairy and young stock, become affected within six weeks of commencement of grazing with a persistent form of scouring, resulting in loss of weight and condition. Treatment consists of removing the animals from the affected pastures and feeding them with dry, fibrous foods such as hay and undecorticated cotton cake. Resistance varies with condition, fattening stock being little affected. Ayrshires are most resistant among cattle, horses are immune and the susceptibility of sheep has been questioned. " Teartness " varies seasonally and annually from pasture to pasture ; it is usually worst from August to October and is most prevalent after a wet summer. It is increased by manuring, but is destroyed after frost. Geologically, teart areas lie within the lower Lias formation. The cause of the disease is unknown ; bacteria, parasites, poisonous plants and the proximate chemical composition have been eliminated as causative agents, and peculiarities of soil texture and drainage appear to be non-specific. A toxic chemical substance has been postulated as the cause, but so far nothing specific has been incriminated.
—Alfred Eden.

I. Bechtel, H. E., Hallman, E. T., Huffman, C. F., & Duncan, C. W. (1936). **Pathology of Rickets in Dairy Calves.**—*Tech. Bull. Mich. agric. Exp. Sta.* No. 150. pp. 47. 34 figs., 9 tables. [18 refs.]

II. Sheehy, E. J., & Senior, B. J. (1936). **Mineral Metabolism in the Calf and the Addition of Inorganic Minerals to the Calf's Diet.**—*J. Dep. Agric. Irish Free St.* **34.** 1-32. 5 figs., numerous tables. [Numerous refs.]

III. Heller, V. G., & Haddad, Matile. (1936). **Paths of Excretion and Mineral Balance in Animals drinking Saline and Alkaline Waters.**—*J. biol. Chem.* **113.** 439-447. 5 tables. [18 refs.]

I. Studies were made upon 11 calves suffering from rickets and 5 normal calves to determine the histological changes that occur under conditions of vitamin D deficiency. One calf recovering from rickets was also studied. The rachitic calves showed decreased values of plasma Ca and inorganic P. The costochondral

junction of the ventral end of the eighth rib was found to be the best index of rachitic changes, and X-rays and histological methods were used. Retarded provisional calcification of cartilage matrix was the most fundamental change in rickets. The cartilage was irregularly removed by the embryonic marrow and osteoid tissue which had accumulated in excess; the latter was responsible for the beading of rachitic ribs, but was exaggerated in appearance by increased curvature of the ribs in a medial direction. Growth and age were found to be modifying factors, since the most severe rickets occurred in rapidly growing calves. The histological changes were fundamentally the same as those recorded for the infant and for the young rat.

II. The digestion coefficient of the dry matter of poor hay fed to calves was raised by the addition of cod liver oil to the diet. Cod liver oil, as a source of vitamin D, raised the retention of Ca and P on a low Ca diet, but proved of no benefit to calves normally well fed and housed.

III. Studies were made upon rats, of the channels through which certain minerals added to the drinking water were eliminated, standard rations being given throughout. Chlorides are principally excreted in the urine but added chlorides pass out in the faeces. Ca and S are retained in the body corresponding to the intake, although the percentages in the urine increase. Mg behaves like Ca, although Mg is displaced from the body following excessive Ca intake. Increase in P intake leads to an immediate increase in the retention and in the percentage in the urine. Generally the faeces are the channel of elimination of the greater part of an excessive mineral intake.—ALFRED EDEN.

I. WALI, Eunice M. (1937). **Trace Elements in Relation to Bush Sickness.**—*N.Z. J. Sci. Tech.* **18.** 642-650. 1 table, 5 graphs. [6 refs.]

II. MCNAUGHT, K. J. (1937). **Cobalt Content of Limonites used in the Treatment of Bush Sickness.**—*Ibid.* 655-661. 1 fig., 2 tables. [18 refs.]

I. A description of experiments carried out at Atiamuri (a " bush sick " district) with sheep drenched with various substances such as limonite, cobalt, zinc, citrate of ammonia and limonite extract.

Cobalt-free citrate of ammonia was found ineffective, as was zinc alone. Cobalt, Australian limonite and Reyburn's New Zealand limonite were reliable, but the iron-free extract of limonite did not appear to prevent " bush sickness ". The suggestion is therefore made that some other catalytic agent is also required to assist cobalt.

Kenya iron oxide was found to be ineffective at Atiamuri. The reason for this was thought to be bound up with the alkalinity and the small quantity of cobalt extractable.

The experiments were carried out on a very small group of sheep.

II. The method of analysis for small quantities of cobalt is described. Tables are then given of the cobalt content of limonites for various parts of New Zealand and the cobalt content of top soils. " Bush sick " soils average 0·12 parts per million of cobalt extractable by decinormal hydrochloric acid, whereas healthy soils yield 0·61 p.p.m.

Effective limonites vary from about 50 to 281 p.p.m. of cobalt. An Australian limonite gave 362 p.p.m. cobalt content.—C. S. M. HOPKIRK.

NEEDHAM, J. (1936). **Substances Promoting Normal and Abnormal Growth.**—*Brit. med. J.* Oct. 10th. 701-706. 1 fig. [Numerous refs.]

In this paper, read at the opening of a symposium held by the British Medical Association at the 1936 Annual Meeting at Oxford, the substances considered and

discussed were those affecting normal and pathological growth and differentiation, and fall under the general headings of hormones – glandular and non-glandular – vitamins, and drug-like substances.—R. Allcroft.

PUBLIC HEALTH.

I. Eriksson, K. (1936). Hygieniska synpunkter på ventilationen av ladugårdar. [**Hygienic Aspects of the Ventilation of Cow Byres**].—*Svensk VetTidskr.* **41.** 51-69. 7 figs.

II. Nohrman, G. (1936). Hygien och värmeekonomi i våra ladugårdar. [**The Hygiene and Heat Economy of Cow Byres**].—*Ibid.* 219-237, 297-317 and 363-373. 1 graph.

I. Temperature, relative humidity, and movement of the air are the most important physical factors. The optima have not been settled for domestic animals. E. is at present engaged in research work on this point, and he gives some preliminary results.

The temperature in byres for milch cows and calves should be 14° to 15°C. and the relative humidity about 70%.

The chief difficulty is to keep the relative humidity sufficiently low. From a hygienic point of view the special disadvantages of a high relative humidity are (1) the evaporation from the animal's skin is reduced and thus its heat regulation is disturbed; (2) the conditions for bacteria are more favourable, and (3) the conditions are deleterious to the building and the fittings.

The only way to maintain a sufficiently low humidity is to regulate the ventilation, but it is usually necessary to compensate for this in cold climates by an adequate heat insulation of the roof, walls, and floor. Cement is a very good material for byre floors if there is adequate insulation against cold and damp from the ground. The methods of providing ventilation are discussed.

II. N. discusses principles of air hygiene in byres on the same lines as E., and gives details concerning ventilation and heat insulation. Examples are given to illustrate the manner in which good heat insulation of the building, in combination with good ventilation, can increase the milk and butter production with the same amount of food.—H. Berthelsen (Stockholm).

THERAPEUTICS.

I. Johnstone, H. G. (1936). **The Chemotherapy of Dirofilaria immitis.**—*Amer. J. trop. Med.* **16.** 207-224. 1 fig. [Numerous refs.]

II. Khaw, O. K., & Cheu, S. H. (1936). **The Treatment of Dog Heart-Worm (*Dirofilaria immitis* Leidy 1856) with Some Organic Antimony Compounds.**—*Chin. med. J.* Suppl. 1. pp. 402-417. 6 figs. on 2 plates, 6 tables, 2 charts. [18 refs.] [In English].

III. Popescu, F. (1936). Die Behandlung der Filariose bei Hunden mit Fuadin. [**Treatment of Canine Filariasis with "Fouadin"**].—*Münch. tierärztl. Wschr.* **87.** 196-197. 2 tables. [11 refs.]

I. A review is given of the literature on the treatment of human filariasis, showing the unsatisfactory position of present knowledge on this subject. J. then gives an account of his own observations on nine infected dogs, using maximum doses of "fouadin" intramuscularly, trypan blue, hexylresorcinol, sodium-iodo-antimonate and roentgen irradiation. The only observed parasiticidal action

followed the maximum therapeutic doses of " fouadin ", but even this affected only the microfilariae and apparently left the adults untouched.

II. Heartworm infestation reaches the high incidence of 50% in some parts of China and is a common cause of death among native and imported dogs. This paper reports on the observed effects of concentrated " fouadin ", " antimosan " and " neo-antimosan " upon the microfilariae, the adult worms and the hosts. Concentrated " fouadin " was found to be the most potent and " antimosan " the least potent, although all acted in a similar way, destroying the microfilariae and some of the adult worms, and sterilizing the surviving females. Dead and moribund worms were found to be carried by the blood stream into the pulmonary artery, leading to thrombosis and the development of infarcts.

All three of the drugs were found to be toxic in therapeutic doses.

III. In some parts of Rumania, dirofilariasis is very prevalent in dogs, but of 33,000 examined at Bucarest, only 32 were infected. P. found that courses of treatment with " fouadin ", consisting of 5 to 11 injections (intraven.) spread over 6 to 27 days, in which a total of from 15-48·5 c.c. of this drug were administered, gave very good results, killing both microfilariae and adults.—E. L. Taylor.

I. Nitti, F., & Bovet, D. (1936). La chimiothérapie des infections microbiennes et les nouveaux essais de traitement et de prévention des streptococcies. [**The Chemotherapy of Streptococcal Infections**].—*Rev. Immunol.* **2.** 450-459. 1 table. [Numerous refs.]

II. Fourneau, E., Tréfouël, J., Nitti, F., & Bovet, D. (1936). Chimiothérapie des infections streptococciques par les dérivés du P-aminophénylsulfamide. [**The Chemotherapy of Streptococcic Infections by the Derivatives of P-Amino-Phenyl Sulphamide**].—*C. R. Soc. Biol. Paris.* **122.** 258-259. [4 refs.]

I. " Protonsil " does not owe its chemotherapeutic action to its properties as a dye, but to the p-amino-phenyl sulphamide nucleus (" 1162 F "), which is at least as active as " protonsil " and less toxic. The ortho and meta isomers of " 1162 F " are inactive and the addition of another amino group renders the compound almost inactive. Oral administration to rabbits of 5 g. of " 1162 F " per kg. body weight produces no toxic symptoms whatever. The substance is active orally and parenterally; it has no action *in vitro*. Like " prontosil ", it is much more effective against very virulent streptococci than against streptococci of low virulence. The mode of action of these substances is discussed.

II. P-amino-phenyl sulphamide (" 1162 F ") is the active nucleus of all the substances studied; 46 derivatives out of 130 were found to possess chemotherapeutic actions. The ortho and meta compounds are inactive. Replacement of the sulphamide radicle by NH_2, CN, SO_3H, ASO_3H_2, $CONH_2$ produces inactive compounds; alcoholic radicles decrease the activity. Various compounds in which the amino group has been replaced are described. A number of dyes with high chemotherapeutic activity similar to " prontosil " are described. The addition of a third radicle to " 1162 F " decreases the activity.—J. M. Robson.

Baudet, E. A. R. F. (1936). Over de fungicide werking van enkele desinfectiemiddelen en andere stoffen op haren, besmet met Trichophyton equinum. [**Trials of Fungicides in Hair Infected with** *T. equinum*].—*Tijdschr. Diergeneesk.* **63.** 835-840. [English, French and German summaries].

The effect of 16 disinfectants on hairs from g. pigs artificially infected with cultures of *T. equinum* was tested. Eight to ten days after infection, the infected hairs, partially covered with white spores, were collected by epilation and exposed

to the action of the disinfectant. After this, the hairs were washed in a sterile physiological salt solution, sown on 4% glucose-agar, and incubated for 14 days at 26°C. The experiments were made in triplicate. When there was no growth after 14 days, the fungus was considered to be killed. In 20% creolin the fungus was killed after 4 to 5 hours' exposure, in 3% formalin after half an hour; 3% carbolic acid also gave a very good result.—M. J. J. Houthuis (Rotterdam).

Leonard, M. A. (1936). **The Treatment of Canine Distemper and Other Diseases by the Intravenous Administration of Hydrochloric Acid.**—*J. Amer. vet. med. Ass.* **89.** 20-25. 2 tables. [3 refs.]

L. claims successful results from the treatment of dogs affected with distemper with HCl (1 : 500 in distilled water) given in 10 c.c. doses (intraven). In 282 cases so treated, the mortality was 14%, as against a normal mortality of 50%.—J. E.

Marotel. (1936). Recherches sur le traitement des dermatoses parasitaires. [**Treatment for External Parasites**].—*Rev. vét., Toulouse.* **88.** 380-385.

M. describes the unsatisfactory results obtained in treating six skin cases (3 sarcoptic mange, 2 follicular mange and 1 trichodect infestation), with a 40% hyposulphite of soda solution, followed in 15 minutes by a 4% solution of hydrochloric acid with frequent repetition of dressing.

He describes the successful results obtained in using creolin solution (Pearson) in strengths varying from 5% to 20%. Twelve cases are recorded (11 sarcoptic mange, 1 haematopinus infestation). He emphasizes the low cost, ease of application and, in his experience, absence of danger from toxicity. The duration of treatment was eight days in mange cases.—J. W. H. Holmes.

I. Kraneveld, F. C. (1936). Oversicht over proeven inzake de tekendoodende werking van derrispoeder-extracten. [**Tests with Derris Extract Against Ticks**].—*Ned.-ind. Bl. Diergeneesk.* **48.** 97-102. 1 table.

II. Ypma, P. C. (1936). De behandeling van aan schurft lijdende geiten met derrispoeder. [**Treatment of Goat Mange with Derris**].—*Ibid.* 192-197. 1 table.

I. K. determined the tick-killing value of derris extracts, partly by means of the submersion of ticks (*Boophilus annulatus*) for a brief period in different solutions of varying rotenone content, and partly by the spraying and washing of two tick-infected bullocks. He found that even solutions with a low rotenone content (ten concentrations were used running from 0·0038% to 1·11%) were able to kill the ticks after a short submersion (5-20 seconds). The washing of a bullock with a 0·2% rotenone solution killed all ticks within ten days; the spraying of another bullock with a 0·1% solution gave less satisfactory results. K. concludes that, although derris powder seems to give tick-killing results, it is doubtful whether it will be of practical value owing to the fact that solutions soon lose their strength and to the cheapness of other reliable dip fluids such as the 80% arsenite of soda solution.

II. A solution prepared by soaking 1 part of derris powder in 25 parts of water for 24 hours at ordinary room temperature was found to be reliable for the treatment of mange in goats. Sixteen infected goats were cured within three to four weeks by repeated brushings (6-9 times with an interval of 2 or 3 days between each treatment). Y. emphasizes the fact that this treatment has the advantage of being easily applied by the natives themselves, that it has no bad effect on the state of health of the patient, and finally, that it is cheap (at Sumbawa 36 cents for 8 brushings).—M. J. J. Houthuis (Rotterdam).

POISONS AND POISONING.

I. Spéder, E. (1936). L'ostéopetrose généralisée ou " Marmorskelett " n'est pas une maladie rare. [**Generalized Osteopetrosis or " Squelette en Marbre "**].—*Maroc méd.* **16.** 121-131. 10 figs. [Numerous refs.]

II. Biester, H. E., Greenwood, D. A., & Nelson, V. E. (1936). **Pathologic and Physiologic Studies on Dogs receiving Fluorine in Doses Comparable to those encountered in Some Water Supplies.**—*N. Amer. Vet.* **17.** No. 10. 38-43. 9 figs., 1 table.

I. An X-ray picture of a man suffering from a broken arm revealed very dense portions of bone in certain parts of the skeleton and cranium, and a generalized osteopetrosis (first recorded by Schoenberg in 1904), although clinically the individual appeared normal. This is the eighth recorded case of " squelette en marbre ". The condition occurs in areas where natural deposits of phosphates are found, particularly where they are worked industrially. From the aetiology and associated tooth lesions it appears to be related to fluorine poisoning. Similar bone lesions have been found amongst animals in this district of Morocco, the disease being known as " darmous ". Osteopetrosis in children may result from intra-uterine fluorosis. Experimental NaF poisoning in animals leads to a hyperparathyroidism with attendant osseous lesions and CaF_2 leads to hypercalcification and eventually osteopetrosis. Similar lesions are reported amongst animals subjected to fluorine intoxication in many parts of the world.

II. Fluorine fed as NaF at the rate of 0·45 to 4·5 mg. per kg. body weight, comparable with amounts found in certain drinking waters, caused mottling in the enamel of the teeth of dogs during the period of calcification of the permanent teeth. The principal histological lesions were found in the small intestine, spleen, bladder, thyroid gland and mesenteric lymph nodes. A diet adequate in all vitamins except C produced after eight and a half months severe myelin degenerations of the spinal cord and local fatty degenerations in the epithelium of some of the convoluted tubules of the kidneys, the lesions being more pronounced in fluorine-fed dogs.—Alfred Eden.

Anon. (1936). **Selenium Poisoning of Crops and Stock.**—*Bull. imp. Inst., Lond.* **34.** 368-370. [5 refs.]

Anon. (1936). **Occurrence of Selenium in Natural and Manufactured Phosphates.**—*Ibid.* 370-371. [2 text refs.]

The selenium of seleniferous areas in the U.S.A. is believed to be derived from sulphide minerals in the soil parent rocks and accumulates in soils where the mean annual rainfall is insufficient to leach it from them. Amounts absorbed by plants vary greatly, depending upon species and upon the amount present in the soil. Animals in thinly stocked areas tend to reject plants with the highest Se content.

Natural phosphates contain from 0·1 to 55 parts per million Se, the element being associated with the organic matter and inorganic sulphide content. The Se content of superphosphate varied from 0·8 to 4 p.p.m. and that of manufactured phosphoric acid was less than 0·5 p.p.m., indicating that the greater part of Se had been removed in processing the natural phosphates.—Alfred Eden.

Bennetts, H. W. (1935). **Plants Poisonous to Live-Stock in Western Australia.**—*J. roy. Soc. W. Aust.* **21.** xi-xxiii. [9 refs.]

This presidential address reviews the poisonous plants problem in Western Australia. Most of the recent investigations outlined herein have been published

elsewhere [*V. B.* **6.** 828.], but this article comprises a useful comprehensive review of the whole subject.—W. I. B. Beveridge.

I. Berselli, L. (1936). Contributo alla casistica degli avvelenamenti da elleboro verde nei bovini. [**Hellebore Poisoning in Cattle**].—*Nuova Vet.* **14.** 197-198.

II. Giordano, O. (1935). Osservazioni su alcuni casi di intossicazione da estratto di tabacco nei bovini. [**Tobacco Poisoning in Cattle**].—*Boll. vet. ital.* **31.** 1845-1849.

I. Two yearling bullocks were treated with a decoction of *Hellebore viridis* for external parasitism. On the following morning, both animals were found to be seriously ill. The skin, especially of the neck where the decoction had been most vigorously applied, was hot, oedematous and painful; the symptoms were a slight rise of temperature, a weak, rapid pulse, muscular tremors, dyspnoea and prostration. One animal was slaughtered but the other recovered after injections of caffein.

II. Several cases of poisoning of cattle by extract of tobacco are recorded. The extract had been used in each case to destroy external parasites. The chief symptoms of poisoning were prostration, muscular weakness, dyspnoea, constipation followed by diarrhoea, a small rapid pulse and exaggerated reflex movements due to damage to the spinal cord.

On *post-mortem* examination, no characteristic lesions could be found, but in most cases it was possible to detect the smell of tobacco from the organs. Tests for alkaloids were usually positive. A tolerance to nicotine develops fairly quickly and the alkaloid is excreted in the urine. The M.L.D. of the extract when applied to the skin is from 400 to 600 c.c. for horses and cattle.—J. A. Nicholson.

I. MacNamee, J. K. (1936). **Physiological, Pathological and Toxicological Effect of Snake Bites on Domesticated Animals.**—*Vet. Med.* **31.** 376-381.

II. Millauer, K. (1936). Kreuzotternbissvergiftungen bei Hunden und Rindern. [**Adder Bites in Dogs and Cattle**].—*Oest. Tierarzt.* **9.** 96-98.

I. McN. made experiments with snake bite on dogs and cats with North American snakes – harlequin snake (*Mucurus euryxanthus*), rattlesnake (*Crotalus* sp. and *Sistrurus* sp.), cottonmouth water moccasin (*Agkestroden piscivorus*) and the copperhead snake (*A. mokasen*). The first secretes a neurotoxic poison and the others a haemotoxic poison, which haemolyses red blood corpuscles and makes small blood vessels permeable. [There is, unfortunately, no description of the symptoms and lesions observed. The author states that he prepared case records, but these have not been printed].

Information is given on the collection of venom and production of antivenin, on therapeutic actions of venom and on the treatment of snake bite. It is said that potass. permanganate has no specific action on the venom and is only useful as a wash because the mouths of snakes commonly contain *Clostridium welchii*. Bitten animals should be kept very quiet for 72 hours and should not be given stimulants in the early stages, as that only aids the diffusion of the poison in the body. Fat animals (swine) are more resistant to snake bite because the poison is absorbed very slowly from fat tissue. Cauterization is contra-indicated as it stops the blood flow – a crucial incision should be made.

II. After commenting on the unreliability of reports of snake bite, M. describes three cases of adder bite in dogs and seven in cattle, in all of which the diagnosis was confirmed or in which the evidence was very strong. The symptoms included enormous local swelling and general depression with recovery in about five days. Only one case, a cow bitten in the lower flank, died.—J. E.

PHYSIOLOGY.

SVENSSON, S. (1936). En kemisk-hormonal dräktighetsreaktion för sto. **[Comparison of Cuboni's Chemical Test and the Biological Test for Pregnancy in Mares].**—*Skand. VetTidskr.* **26.** 550-556. 2 tables. [5 refs.] [English summary].

S. tried Dyekjaer's modification of Cuboni's method in 142 controlled cases. It proved to be more reliable than the biological reaction in 115 cases (2·86% of incorrect results against 5·26%).

The test involves the addition of HCl to filtered urine, heating and extracting with benzol, and the addition of H_2SO_4 to the extract.—G. NAERLAND (OSLO).

WHITE, P., & CAUGHLEY, F. G. (1936). **Seasonal Variations in Lamb-Skins, with Special Reference to the Sudoriferous Glands.** —*N.Z. J. Sci. Tech.* **18.** 466-473. 4 plates.

The work described shows that, as perspiration increases owing to seasonal conditions, the sudoriferous glands may enlarge so as to impair the leather value of the skins. The size of the glands decreases as the need for perspiring decreases.
—C. S. M. HOPKIRK.

JOSLAND, S. W. (1937). **Total Ash of Sheeps' Bones as an Index to Calcification.** —*N.Z. J. Sci. Tech.* **18.** 665-668. 4 tables. [3 refs.]

Results of analyses of various bones from sheep as an indication of mineral deficiency. The heads of the femur and humerus were found to give a reliable index.

Calcification of lambs' bones was found to be complete at the age of four months.—C. S. M. HOPKIRK.

MISCELLANEOUS.

I. GREAT BRITAIN. (1936). **Ministry of Agriculture. The Warble Fly (Dressing of Cattle) Order of 1936.**—*Gt. Brit. Statutory Rules & Orders, 1936.* No. 71. pp. 3. London: H.M. Stat. Off. [8vo] [1d].

II. NORTHERN IRELAND. (1936). **Ministry of Agriculture. The Destruction of Warble Fly Maggots in Cattle.**—*Leafl. Min. Agric. N. Ire.* No. 64. pp. 8. 1 table.

I. This order extends the Diseases of Animals Acts, 1894-1935, to include infestation of cattle with *Hypoderma bovis* and *H. lineatum*. Farmers are required to destroy warble-fly larvae in their cattle, either by removing the larvae from the swellings on the animals' backs, or by dressing the cattle with a preparation of powdered derris root and soap. The specifications of the dressing are that a gallon of wash must contain either 1·5 oz. derris resins or 0·5 oz. of rotenone, and 4 oz. soap.

Dressings must be carried out at intervals of from 27 to 32 days, commencing between March 15th and 22nd. They need not be continued after June 30th.

II. This leaflet summarizes the life-history and damage caused by the warble fly, and describes briefly the experimental results which showed that derris-containing washes were effective against warble larvae, and led to the decision by the governments of Britain and Northern Ireland to make dressing compulsory.

The leaflet gives the standards prescribed for derris dressings, to comply with the order for Northern Ireland, and details of the manner and times of use.—J. MacL.

DU TOIT, P. J. (1936). **Co-operation between the Division of Veterinary Services and the Farmer.**—*Fmg S. Afr.* **11.** 223.

This article is an appeal for co-operation between the farmer and the Division of Veterinary Services, both in assisting in the research problems of the laboratory, and in helping to carry out the necessary measures for the control of animal diseases. Instances are given of the value of experimental work on farms in confirmation of laboratory findings. In the eradication of ticks the value of the co-operation of the veterinarian and the farmer, and between farmers themselves is emphasized. —E. M. ROBINSON.

LECLAINCHE, E. (1936). Principes de la législation sanitaire. [**Principles of Sanitary Legislation**].—*Bull. Off. internat. Epiz.* **12.** 397-406. Discussion pp. 608-622. [11 refs.]

L. reviews the present organization for the control of animal diseases, criticizing certain methods and suggesting new ones. He considers that the actual laws should be in general terms, giving broad executive powers to the departments concerned, the details relating to the actual execution of control schemes being given in departmental orders. Thus the legislation passed would leave technical procedures open and they could then be modified to meet advances in knowledge. Voluntary schemes are preferable to compulsory ones, and local efforts to general ones in many cases. Control schemes for tuberculosis are reviewed, and L. emphasizes objections to continuous pecuniary aid for farmers: this aid is desirable in the early stages of control, but should be dropped when some progress has been made.

It is very wasteful to try to eradicate bovine tuberculosis, bovine brucellosis, and mastitis separately. Collective control should be exercised, even while the relevant technical knowledge is still incomplete.

L. considers that the main hope of eradicating these diseases lies in the searching out of the clean herds and the building up of a new livestock population from them: infected herds should be relegated to a place of minor importance, as regards the time and money to be expended on the control scheme as a whole. He questions whether it is worth the trouble and expense to try to free infected herds from tuberculosis, brucellosis and mastitis. Reference is made to some recent articles discussing this point.

Those engaged in state disease eradication work must be very carefully chosen for their ability to enlist willing co-operation by livestock owners, and must be given special instruction before engaging in the work.

At the present time, state veterinary services in civilized countries are organized to deal only with outbreaks of animal diseases. L. holds that animal diseases and animal health ought to be considered together as a section of national economy and that animal husbandry ought to be planned with the best technical advice, including advice on scientific breeding.—J. E.

LHOSTE, A. (1936). Les conventions vétérinaires internationales. [**International Veterinary Conventions**]. pp. 132. Paris: Vigot Frères. [8vo] [Fr. 15].

A historical review of national and international control of animal diseases and an account of the present position in Europe, including a list of international conventions in force, mostly bipartite, a description of the Office international des Epizooties and the text of three international veterinary conventions drawn up by

the League of Nations and signed, in 1935, by some, but not all, of its member nations.

The object of the latter is the prevention of the transmission of animal disease between nations without hampering international trade.—J. E.

ANON. (1936). Norges veterinaerhøiskole. [**Norway's Veterinary College**]. pp. 136. 35 photographs, 8 plans. Oslo : J. W. Cappelens Forlag. [8vo].

One hundred years elapsed between the first proposal for founding a veterinary academy in Norway and the actual inauguration of the newly built Veterinary College of Norway, which was celebrated in August, 1936. The story of establishing an academy for veterinary education in Norway is, therefore, a long one, accompanied by frequent disappointments.

In his book " Episodes in the History of the Veterinary Service of Norway " (Oslo : 1925) HORNE gave a detailed account on the history of the problem up to the nineties. The aim of the present work is, therefore, to act as a supplement to the former one, but it is more than that. It gives a summarized picture of the history of the scheme for a Norwegian veterinary high-school from the time when such an institution was first proposed, in 1818, until the buildings of the newly founded college were erected and the first term's instruction could begin in the autumn of 1936. This commemorative publication, therefore, indicates the commencement of a new era in the history of the veterinary service of Norway.

In separate chapters descriptions are given of the college buildings, with several photographs of the interior, drawings and a ground plan ; the organization of the college and its administration are detailed and the approved plan of the course of veterinary education is given.

The book is edited by the Veterinary Office of the Ministry of Agriculture and arranged by T. BULL NJAA, secretary, and H. J. SPARRE, architect, under the auspices of N. THORSHAUG, the Veterinary Director.—GUSTAV NAERLAND (OSLO).

LEHNERT, E. (1936). Die Organisation der tierärztlichen Hochschule Schwedens. [**The Veterinary College of Sweden**].—*Dtsch. tierärztl. Wschr.* **44.** 709-711.

A general description of Stockholm Veterinary College, which in its present form was built in 1912 under the rectorate of the late Professor VENNERHOLM. The curriculum extends over nine sessions and four and a half years and there are two examinations to be passed. The present number of students is 160 and there are eight professorial chairs. The standard of education is similar to that of German veterinary schools.—J. E.

NICOLLE, C. (1936). Responsabilité du chef dans un laboratoire de médecine expérimentale. [**The Responsibilities of the Director of a Medical Research Laboratory**].—*Arch. Inst. Pasteur Tunis.* **25.** 1-27.

N. discusses the responsibilities of the director of a hypothetical institute of experimental medicine, taking in the main as his pattern one of the many Pasteur Institutes. He refers particularly to the variety of means by which such institutes are supplied with funds and to their organization. Some rely largely upon state grants and their own commercial efforts and others are well endowed and supported by the public.

As regards organization, N. favours direction by one man and not by a committee, and the appointment to the post of director of a young man for a period of ten years.

The qualities desirable in a director, and the main lines of organization, are discussed at length.—C. V. WATKINS.

TURNER, Helen N. (1936). **Statistics for the Veterinarian.**—*Aust. vet. J.* **12.** 90-100. 1 fig., 6 tables. [16 refs.]

This is a very useful paper, perhaps the first of its kind in veterinary literature to explain the commonly used statistical terms and methods in a manner which makes them readily understood by those without training in statistics. Statistical methods having particular reference to experiments dealing with veterinary problems are fully detailed and a number of actual examples are given. Such methods are discussed under the following headings: arithmetic mean, standard deviation, variance, standard error, coefficient of variation, probable error, frequency distribution, probability and meaning of statistical significance, control of variation, methods for lay-out of experiments, etc.

The mass of information in this paper cannot be given in abstract form, and the original should be consulted by all who plan experiments.—H. McL. GORDON.

VITZTHUM, H. (1934). Das zoologische Prioritätsgesetz. [**The Law of Priority in Zoology**].—*Tierärztl. Rdsch.* **40.** 485-489. [3 refs.]

Zoologists are frequently accused by veterinarians of changing the names of parasites without good reason for doing so. V. here replies to this criticism, and gives some good examples to show the necessity for rules and the way in which these can prevent the confusion which often occurs in the reference to parasites of domestic animals.—E. L. TAYLOR.

OFFICIAL AND OTHER REPORTS.

GREAT BRITAIN. (1936). **Statistical and General Report, Army Veterinary Services, 1935-1936.** [TAPLEY, J. B.] pp. 24. 10 tables. London: War Office. [4to].

The strength of the British army in horses and mules during the year under review is first given. It amounts to 12,036 horses and 210 mules. Notes follow on inefficiency and wastage (with special reference to wastage due to age). A short account is then given of the incidence of diseases, including diseases of the digestive and respiratory systems, surgical conditions, etc. Similar particulars are given concerning army animals in Egypt, where there are 1,845 army horses and 527 army mules.

The annual report of the Army Veterinary School at Aldershot is included in the pamphlet, and describes the instructional work carried out and the activities of the school laboratory, including radiological work. In the course of the latter, 826 radiographs were made, interpreted and reported on during the year, and in 64 cases these were subsequently supported by *post-mortem* examinations. Reference is made to original research work undertaken at the school, but no details are furnished.

The instructional and productive work of the Army School of Farriery is also dealt with in the report, which concludes with a number of tables showing causes of wastage and mortality, including the incidence in the army of various types of disease.—C. DAVENPORT.

CYPRUS. (1936). **Report of the Veterinary Service for the Year 1935.** [ROE, R. J.] pp. 12. 5 tables. Nicosia: Govt. Printing Office. [fcp].

STAFF.—The technical staff consists of the Chief Veterinary Officer, one veterinary officer, one veterinary inspector, nine stock inspectors and two laboratory assistants.

GENERAL.—Better climatic conditions and crops resulted in an improvement in the condition and the numbers of livestock.

Livestock, chiefly mules, valued at about £50,000, was exported through the government lairages. As Cyprus is free from many of the animal diseases found in neighbouring countries, stringent control is exercised on the importation of animals.

The Horse Breeding Law (1930), which provides for the licensing of approved stallions, has led to improved conformation and soundness of mules.

All matters appertaining to milk production are under the supervision of the Chief Veterinary Officer. All dairy cattle on registered premises are tuberculin-tested.

Meat inspection in the four principal towns is carried out by municipal inspectors acting under the instructions of the Chief Veterinary Officer. Statistics from these four towns are given.

Details are given of the medical and surgical treatment rendered to private owners and to the horses of the Cyprus Mounted Police.

DISEASES.—Anthrax, sheep pox, and parasitic gastro-enteritis are responsible for the major number of outbreaks recorded. There has been a steady reduction in the incidence of ANTHRAX, due to intensive propaganda and vaccination on a large scale. The method used is one inoculation of a spore vaccine. Over 600,000 animals were vaccinated.

BOVINE CONTAGIOUS ABORTION, MALTA FEVER, BOVINE TUBERCULOSIS and GOAT POX have been eradicated by veterinary control measures.

Parasitic diseases of all animals and poultry diseases cause heavy losses, and close attention is given to them by the department.

The veterinary officer was principally occupied in the production of anthrax vaccine. Vaccines against sheep pox, fowl pox and fowl cholera were also prepared, and a survey of the parasites of livestock was commenced.

629 specimens were examined in the laboratory.—F. H. MANLEY.

BRITISH GUIANA. (1936). **Report on the Veterinary Division for the Year 1935.** [BONE, T.]—*Div. Rep. Dep. Agric. Brit. Guiana, 1935.* pp. 111-113.

The veterinary department was employed on routine duties in connexion with the government breeding stations. Livestock rearing remained backward owing to unfavourable conditions and the lack of enthusiasm of livestock owners to act on the advice given.

The only contagious disease that gave trouble was strangles.—J. E.

FALKLAND ISLANDS. (1935). **Stock Report for the Year ended 30th June, 1935.** [BONNER, A. M.]—*Falkland Is. Gaz.* Dec. 1st. 153-158. 6 tables.

A review of the sheep industry with a detailed animal census. The total in 1935 was 615,682 sheep, 3,378 horses, 10,072 cattle and 29 pigs. There is no veterinary officer now in the Falkland Islands.—J. E.

NORWAY. (1936). 1935 Årsberetning fra torvdirektørens administrasjon. [**Report of Oslo Abattoir for 1935**]. [GANN, S.] pp. 15. 12 tables. Oslo: J. Chr. Gundersens Boktrykkeri. [8vo].

Among other details, the report contains figures in tabular form showing the work of the Oslo abattoir in 1935, the number of animals slaughtered, the number of carcasses dealt with, the number of carcasses judged " second class ", and the number found unfit for human consumption, together with the causes. The whole supply was of Norwegian origin, except 22 cattle and 18 fattened calf carcasses

imported from Sweden after slaughter by the Jewish method [because of legal prohibition of the method in Norway]. Of a total of 47,737 cattle carcasses, of which 28,507 were slaughtered at the abattoir, tuberculosis was found in 154 cases, 115 being animals detected by the tuberculin test and slaughtered on that account. Of 125,789 carcasses of swine, 14,621 of which were slaughtered at the abattoir, tuberculosis was found in 1,291 ; it was generally confined to the lymph nodes of the neck and mesentery. Muscular cysticercosis (*C. bovis*) was found in 13 bovines.

Bacteriological tests were carried out on material from 1,036 carcasses.

—G. NAERLAND (OSLO).

ESTONIA. (1934). Eesti põllumajandus statistiline aastaraamat 1933. VII. Loomade tervishoid. [**Estonian Agricultural Statistics for 1933. VII. Animal Health**]. pp. 43-55. Numerous tables. Tallinn : Riigi Statistika Keskbüroo. [8vo].

ESTONIA. (1935). Eesti põllumajandus statistiline aastaraamat 1934. VII. Loomade tervishoid. [**Estonian Agricultural Statistics for 1934. VII. Animal Health**]. pp. 44-53. Numerous tables. Tallinn : Riigi Statistika Keskbüroo. [8vo].

This section of the statistics deals with animal diseases and veterinary services in tabular form, headings in Estonian and French being used. Animal disease statistics are set out in columns for animal species, for the common infections and parasitic diseases. In 1933 the commonest horse disease was strangles, followed by tetanus, sarcoptic mange and anthrax (17 cases). Important cattle diseases were piroplasmosis, brucellosis, tuberculosis and malignant catarrh. Liver rot was a common sheep disease. In swine, enzootic hepatitis and swine erysipelas were common. Distemper was observed in 164 dogs and rabies in 85. In 1934, 170 cases of rabies in dogs were observed.—J. E.

ŠIFMANOVIČ, G. L. (1936). Itogi 1935 goda i perspektivi razvitija vetdela v 1936 g. [**Summary of Work done in 1935 and Development of Veterinary Activities in 1936 in the U.S.S.R.**]—*Sovyet. Vet.* No. 3. pp. 5-10.

The increase of livestock on state and collective farms in the U.S.S.R. in 1935 testified to the increased effectiveness of veterinary control and improved sanitary conditions. There was an increase during the year in the number of veterinary clinics and biological stations. Specialists for certain diseases of animals were appointed to some districts. Good work was done in the departments of helminth control, control of the diseases of young animals, and glanders control.

Among the projected improvements for 1936 were :– better qualified veterinarians, more numerous and better-served veterinary clinics, improvements in the methods of the manufacture of biological products, and courses of instruction for farm workers.

I. FRICKERS, J. (1935). Rapport over de veeziekten en rundveeteelt op Trinidad, in de omgeving van Ciudad-Bolivar (Venezuela) en Britisch-Guiana. [**Report on Journey from Surinam to Study Animal Diseases and Cattle Breeding in Trinidad, Ciudad-Bolivar (Venezuela) and British Guiana, 1934**]. pp. 84. 2 tables. [Numerous refs.] [8vo].

II. CURACAO. (1935). De veeartsenijkundige dienst van het gebiedsdeel Curacao 1934. [**Report of the Veterinary Service Curacao, 1934**]. [SARDEMAN, F. H.]—pp. 77-80 of above report.

I. The author, a government veterinary surgeon, made a study tour of adjacent countries with the object of applying data thereby secured to the improve-

ment of animal husbandry in Dutch Guiana. [Conditions in the British territories, being known from other sources, are not described here]. Farming in Venezuela is described. Stock diseases in that country include anthrax – which is not extensive – calf septicaemia, " tristeza " (piroplasmosis and anaplasmosis), mal de caderas and myiasis. It is suspected that " paralytic rabies " as observed in Trinidad and parts of South America, occurs and also the typical rabies associated with canine transmission.

II. A few notes are given on animal husbandry, and meat, milk and market inspection.—J. E.

ALGERIA. (1936). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie, en 1935. **[Report of the Pasteur Institute, Algiers, 1935].** [SERGENT, Ed.] —*Arch. Inst. Pasteur Algér.* **14.** 221-258. 1 table. [Numerous refs.]

S. considers that *Theileria dispar*, as seen in Algeria, is identical with or closely related to the parasite which causes similar disease in Palestine [*V. B.* **6.** 585 and 862]. Preliminary results indicate that this organism can be used for the premunition of the Palestinian disease. A case of congenital infection with *Babesia caballi* in a mule was observed in Algeria.

Reference is made to the value of large-scale vaccination of dogs against rabies in French African possessions and of Plantureux's antiserum against dog distemper.

Sarnowiec's antigen for a swine fever test (formolized infective blood mixed with castor oil) causes reactions in immune animals, but not in healthy or sick ones. Thus, such a preparation derived from suspected cases of swine fever, injected into immune pigs, is a good diagnostic agent.

Sheep pox virus was successfully grown in a medium of Drew's liquid, fresh sheep serum and live testicle tissue.

Results of laboratory diagnostic work on animal diseases and a record of biological products made are given in tabular form.—J. E.

BOOK REVIEWS.

SEIFRIED, O. [Vorstand des Instituts für Tierpathologie der Universität München]. (1937). Die Krankheiten des Kaninchens mit besonderer Berücksichtigung der Infektions- und Invasionskrankheiten. **[Diseases of Rabbits].** pp. ix. + 254. 91 figs. [Numerous refs.] Berlin : Julius Springer. [2nd Edit.] [8vo] [RM. 24].

In view of the world-wide use of rabbits as experimental animals, a thorough understanding of the natural and experimental diseases of these animals is very necessary, and, to this end, S. has compiled a complete but not too bulky book of reference on the subject. It must be emphasized that the book has been produced entirely from the professional standpoint and would be valueless to the layman.

Diseases have been classified as infectious (including bacterial and virus disease), invasive (including helminths and insect parasites), hereditary, dietary deficiencies, tumours, poisoning, and sporadic conditions of doubtful nature.

What is known of each condition is recorded clearly and concisely, the author confining himself to facts, and as far as possible avoiding discussion. By the use of different-sized type he has indicated his own personal opinion regarding the value or reliability of the information recorded and, for the convenience of those who prefer to examine the original work, he has included a valuable bibliography at the end of each chapter. Macroscopic and microscopic pathological changes

are illustrated with about 90 plates, many of which demonstrate abnormalities with exceptional clarity.

The order in which diseases are described is somewhat puzzling, the following being an example of sequence :– diseases resembling tuberculosis (*e.g. Pasteurella pseudotuberculosis* infection), salmonella infection, tularaemia, tuberculosis, types of conjunctivitis, infectious monocytosis, a renal infection, enteritis, brucellosis, and bacillary necrosis. Similarly, in the descriptions of the aetiological agent, insufficient emphasis has been laid upon the systematic classification of the causal organism and valuable comparative data have thus been omitted. The index, which contains about 700 entries, should be considerably extended if the publication is to be of maximum value as a reference work.

The foregoing criticisms are not important and the points mentioned detract but little from the value of this book, which should fill a long-felt want.
—E. J. PULLINGER.

BRUMPT, E. [Membre de l'Académie de Médecine, Professeur à la Faculté de Médecine de Paris, Secrétaire général de l'Institut de Médecine coloniale, Directeur de l'Ecole de Malariologie de l'Université de Paris]. (1936). Précis de Parasitologie. **[Précis of Parasitology]**. 2 vols. pp. xii + 2,139. Numerous figs., plates and tables. [Numerous refs.] Paris : Masson et Cie. [5th Edit.] [8vo] [Fr. 200].

The new fifth edition of the author's classical work on human parasitology has been issued in two volumes, the main extension being in the section devoted to vegetable parasites under which are included the streptothricoses, ringworms and moulds. In general, arthropod parasites as vectors of disease have been much more fully dealt with than in previous editions, and a welcome addition is the chapter devoted to mites and ticks, on which Brumpt is an acknowledged authority.

In a foreword, B. draws attention to the difficulty of keeping publications up to date, in view of the rapid advances which are being made in knowledge, and he stresses the most important discoveries which have been made in recent years. He states that the book is intended for colonial medical men, zoologists and others who wish to extend their studies beyond the limits required for the passing of examinations. Covering, as it does, every aspect of parasitology, protozoa, helminths, arthropods and fungi, their classification, the diseases they cause, and the methods of treatment and control of those diseases, the book is a wonderful achievement, but there are bound to be omissions, and the impression is given that for the advanced student the time has come when each subject requires a separate volume.—U. F. RICHARDSON.

ZUMPT, F. (1936). Die Tsetsefliegen. Ihre Erkennungsmerkale, Lebensweise und Bekämpfung. **[The Classification, Bionomics and Control of Tsetse Flies]**. pp. iv + 149. Numerous figs., plates and graphs, 6 tables, 9 maps. [Numerous refs.] Jena : Gustav Fischer. [8vo] [RM. 10.50].

This book is an excellently compiled description of tsetse flies in which special attention has been paid to their habits and the modern methods of investigation into their bionomics and control. All recent literature has been consulted and is presented here in one volume which allows of easy reference and comparison between the methods and results obtained by different investigators. Control measures are perhaps not so fully discussed as might be desired, but the main principles on which they are based are given, and the very complete list of references indicates original papers which should be consulted for details.—U. F. RICHARDSON.